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BISMUTH OXYIODIDE.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By Frank X. Moerk, Ph.G.

Read at the Pharmaceutical Meeting, May 17.

In the March number of the American Journal of Pharmacy, I gave a method for the preparation of pure oxyiodide of bismuth. The salt obtained presents a characteristic crystalline appearance, and if made from a subcarbonate perfectly free from subnitrate, is of a copper-red color. The presence of very small quantities of subnitrate gives a purplish tint to the compound, the depth of which depends upon the amount present.

My attention was called to the crystalline structure, and it was asserted that as the preparation is used as a local application for dusting on sores, it is necessary to have it in as fine a state of division as possible. A specimen was shown me, made by a large firm of this city, which was in the condition of an impalpable powder, bulky, and of a light brick-red color. It was stated to be pure as found by analysis.

To obtain the oxyiodide in this condition I undertook new experiments.

Powdering the crystalline salt resulted in yielding a yellowish-red powder, dense and cakey. This is only gotten after long-continued trituration, and in small quantities.

Next were tried a number of modifications of the process published, such as using the acid of various strengths, adding these to the subcarbonate, &c., but they did not give a superior product, being crystalline in every instance.

As a final attempt, bismuthous hydrate was precipitated, and this treated with hydriodic acid; the product was amorphous and of a red color. After a number of trials the following formula was adopted as giving a satisfactory preparation:

Iodine	4.6 gm.
Bismuth subnitrate	10 gm.
Nitric acid, 1·42	10 cc.
Solution of soda, U. S. P.	150 cc.
Water, a sufficient quantity.	

The iodine is covered with 50 cc. water, and converted into hydriodic acid by passing H_2S through the mixture, boiling to remove excess of H_2S and filtering.

The subnitrate is dissolved in the nitric acid, diluted with 10 cc. water, and then enough water added to produce a slight permanent opalescence; this mixture is then slowly poured into the solution of soda, taking the precaution to stir constantly. The precipitate is washed by decantation until the washings cease to blue red litmus paper; 50 cc. water added to it, and the hydriodic acid gradually poured in until after stirring and allowing to settle the supernatant liquid has a yellow color. The oxyiodide is washed by decantation, removed to a filter, allowed to drain, and, finally, dried at a temperature not exceeding 100° C. The oxyiodide so gotten has a light yellowish-red color, and contains no water of crystallization, as was found by analyzing some made without the application of heat.

The process is tedious and laborious; the variability of the commercial subnitrate tends to make it wasteful. Ordinarily the subnitrate yields from 79 to 82 per cent. of oxide, but in the above experiments the salt gave as much as 85 per cent. Bi_2O_3. It was found that in the manufacture of this ammonium hydrate had been used to increase the yield as the odor of ammonia was perceptible on warming with Na OH.

The amount of iodine given above was calculated to convert 10 gm. of this subnitrate into oxyiodide, and any one making large quantities would do well to examine the subnitrate for its percentage of oxide and make a calculation to suit.

Linseed oil has been found by a correspondent of the *Boston Med. and Surg. Jour.* to be a very efficient remedy in pruritus ani with no rectal complications; when freely used externally it gives immediate relief.

AMYL ACETATE.

By Henry Trimble.

Read at the Pharmaceutical Meeting, May 17th.

This compound ether has recently come into use for manufacturing purposes without attracting any scientific attention. Its value depends on the excellent solvent power for pyroxylin which it possesses. Good soluble gun cotton will dissolve in it until a jelly is formed and the vessel may be inverted. On this account it has become valuable to the manufacturer of celluloid, and to the manufacturer of certain kinds of lacquer for coating brass and copper. These two industries are consuming enormous quantities of this solvent, and the probabilities are that the use of it has not fairly commenced.

The employment of acetate of amyl or pear oil in the manufacture of artificial fruit essences has long been known, and for this purpose it has commanded a high price, so high indeed as to exclude the possibility of its general use as a solvent; but for the above mentioned industries it can be made commercially pure to answer the purpose as well as the highly purified and more agreeably smelling compound. Two patents have been taken out in England during the past three years bearing on this subject. One on account of its property of dissolving gun cotton, the other on a method of manufacture. In the former the inventors claimed the solution to be valuable for the making of varnishes, and that "when 200 parts nitro-cellulose are mixed with 600 parts acetate of amyl a mass of doughy consistency is obtained, which can be used for any purpose for which celluloid is used. With the addition of castor oil, china clay, and a small proportion of certain essential oils, a compound suitable for the production of artificial leather may be produced."

Several methods of manufacture have been prepared, but the one most common in this country consists in heating in a lead or glass retort a mixture of acetate of sodium or calcium, suphuric acid and fusel oil.

The ether distils at 137° C., has a specific gravity at 15° of ·876 and is almost absolutely insoluble in water. Its solvent action is not confined to gun cotton for it readily dissolves tannin, fixed and volatile oils, resins and camphors, and may become a valuable solvent in pharmacy in addition to the several uses it already possesses.

COLORLESS HYDRASTIS.

By Gust. Steinmann, Ph. G.

Read at the Pharmaceutical Meeting, May 17.

In the examination of three samples from different manufacturers of colorless hydrastis, I find in No. 1 the alkaloid as sulphate in a mixture of glycerin and water having the specific gravity, 1·15, and giving after ignition 0·05 per cent. ash. In No. 2 two acids were present, hydrochloric and sulphuric, combined with the alkaloid, aluminium, and a trace of potassium; specific gravity 1·13; ash 0·35 per cent., which gave 0·12 per cent. aluminium oxide, showing that the alkaloid is present as chloride and aluminium as sulphate. The potash alum probably, was used in the process of decolorizing or to prevent the method of manufacture becoming known. In No. 3 the alkaloid was present as a chloride; also found boracic acid; specific gravity 1·12. There being organic matter present it was difficult to reduce to ash.

The tests given by the manufacturers are the ammonia test:

No. 1. Slight precipitate.

No. 2 and 3. Curdy precipitate.

Fluorescence tests:

No. 1 and 3. With sulphuric acid and potassium permanganate.

No. 2. Equal parts of alcohol and colorless hydrastis with a few drops of ammonia.

The ammonia test in No. 1 gave a clear solution with a slight precipitate; 2 and 3 cloudy solutions and heavy precipitate. With Mayer's reagent all gave cloudy solutions with slight precipitates which, on heating, became clear, leaving a light yellow precipitate, the liquids becoming turbid on cooling. The fluorescence test, which is characteristic for the alkaloid, is made by adding sulphuric acid to the solution, then potassium permanganate, the color of which, on shaking, disappeared, leaving a decided blue fluorescence. When the original solutions were evaporated in a water bath to a syrupy consistence they assumed a yellow color.

Samples were prepared: one containing 20 grains of hydrastine-sulphate in a solution of glycerin and water having the specific gravity 1·15, which answered the tests of No. 1, and, no doubt, is identical. Another was prepared containing 20 grains of the chloride of hydrastine with alum, which gave characteristic tests as in No. 2, with the

exception of the ammonia test, which gave a precipitate of less bulk. The third was prepared from the chloride with boracic acid, which gave characteristic tests, but the ash was not as difficult to obtain. These experiments were made in the chemical laboratory of the College.

AN ANALYSIS OF CACAO SHELLS.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By P. S. Clarkson.

Read at the Pharmaceutical Meeting, May 17.

As no complete analysis of these shells or husks, as they are sometimes called, is to be found in any work on chemistry and as it is stated that they are used to adulterate ground spices and various other foods, it was thought desirable to make one, to aid, if possible, their detection when so used. These shells can be purchased at any of the large groceries, being put up in packages of one pound each by a well known chocolate firm and recommended for making a drink resembling coffee. To make this beverage the shells are boiled with water, strained, and to the resulting infusion, milk and sugar are added.

The amount of ash was found to be 9·07 per cent. which in addition to the usual constituents contained aluminium. This element has not been reported in some analyses of the ash, but was found by Wanklyn in the ash of cacao.

There was found 5·32 per cent. of fat soluble in petroleum spirit and ether melting at 35°. This is the oleum theobromæ of the Pharmacopœia.

A resin was found to the extent of ·93 per cent. which was soluble in ether and alcohol. It had a strong odor of cacao.

An alkaloid consisting of ·90 per cent. was obtained with absolute alcohol. This gave the usual reactions for theobromine. A large quantity of coloring matter, (cacao red), was also extracted by this menstruum. The amount of alcoholic extract was 5·60 per cent.

The mucilage extracted by water was 5·60 per cent. The remainder of the 6·30 per cent. extracted by water was coloring matter with albuminoids.

The albuminoids soluble in dilute soda solution amounted to 7·90 per cent. A determination of the whole of the albuminoids present was made by a combustion with soda-lime which showed 10.92 per cent.

The matter extracted by dilute acid was 6·00 per cent. consisting of albuminoids, calcium oxalate, etc.

The amount of lignin and incrusting substances dissolved by chlorine water was found to be 12·60 per cent.; the intercellular substances, (hydrocellulose, etc.,) amounted to 14·10 per cent. and the cellulose was 20·92 per cent.

SUMMARY.

Ash	9·07
Moisture	66·0
Petroleum extract, cacao butter	5·32
Ether extract, resin	·93
Alcohol (absolute) extract: alkaloid ·90, coloring matter 4·70	5·60
Distilled water extract: mucilage 5·60, albuminoids ·70	6·30
Dilute soda extract, albuminoids	7·90
Total albuminoids by combustion 10·92	
Dilute acid extract, calcium oxalate, etc	6·00
Loss by chlorine, lignin, etc	12·60
Hydrocellulose, etc	14·10
Cellulose	20·92
	95·34
Undetermined matter and loss	4·66
	100·00

LABORATORY NOTES.

By Henry Trimble.

Read at the Pharmaceutical Meeting, May 17th.

In addition to the work on cacao shells by Mr. Clarkson there have been examined three other drugs, in the form of powder, by students in the Chemical Laboratory during the past winter; the object being to do something towards establishing standards which might aid in determining the impurity of a sample without taking the time to examine the character of the adulteration, the results to be a guide and an addition to a physical examination, and not considered as absolutely conclusive.

Jas. A. Ferguson Ph. G., determined the amount of ash in three samples of *Ceylon cinnamon* with the following results: No. 1, 4·00 per cent.; No. 2, 4·00 per cent.; No. 3, 5·00 per cent. 10 grams of No. 1 were exhausted with petroleum spirit in a continuous extraction apparatus, and yielded .75 per cent. of a yellowish oleoresin, which became crystalline and was almost completely soluble in 95 per cent. alcohol. That insoluble in petroleum spirit was exhausted in the

same manner with stronger ether, by which 1·20 per cent. of a reddish-brown extract were obtained. This had in a marked degree the odor and taste of the original drug, thus showing that petroleum spirit will not exhaust all the odorous principle from this bark. Absolute alcohol extracted 14·70 per cent. of a reddish-brown mixture composed of resin, tannin and coloring matter.

The same gentleman estimated the ash in four samples of powdered *cinnamon cassia* and obtained in No. 1, 2·8 per cent.; No. 2, 2·5 per cent.; No. 3, 4·6 per cent.; No. 4, 5·00 per cent.

In both of the above series No. 1 was undoubtedly pure and may be taken as a standard. In the first series No. 2 was also probably pure, while No. 3 was, no doubt, adulterated. The cassia sample No. 2 was probably pure, while Nos. 3 and 4 were undoubtedly adulterated; such samples would be worthy of further critical examination. From the amount of ash in cacao shells it would be reasonable to suppose that they had become mixed with the cassia and raised the ash over 2 per cent.

R. C. Werner, Ph. G., examined five samples of *ground mustard* (Sinapis alba). No. 1, the purity of which I can vouch for, yielded 6·00 per cent. of ash, and was free from starch. No. 2, 5·00 per cent.; No. 3, 4·50 per cent.; No. 4, 4·25 per cent.; No. 5, 5·25 per cent. of ash.

Each of the last four gave abundant evidence of starch. As that was the only adulteration found, the ash might reasonably be taken as an index of the amount of it. In which case we would have about the following:

No. 1.	Pure.			
No. 2.	Mustard	83 parts.	Starch	17 parts.
No. 3.	Mustard	75 parts.	Starch	25 parts.
No. 4.	Mustard	70 parts.	Starch	30 parts.
No. 5.	Mustard	87.5 parts.	Starch	12.5 parts.

Nos. 2 and 3 were obtained from grocers; Nos. 4 and 5 from pharmacists.

G. Steinmann, Ph. G., examined seven samples of *powdered squill*. The ash amounted from No. 1, to 3·30 per cent.; No. 2, to 8·20 per cent.; No. 3, to 2·70 per cent.; No. 4, to 3·95 per cent.; No. 5, to 3·65 per cent.; No. 6, to 3·30 per cent.; No. 7, to 4·00 per cent. No. 1 was known to be pure, therefore was free from starch or any other substance that might be added on the pretext of assisting the grinding or

preventing "caking" of the powder. Although this specimen has been kept since January there is no sign of the "caking" sometimes complained of; the only precaution has been to keep it in a well corked bottle. The ash of No. 2 consisted largely of calcium sulphate, which points to an admixture of about 5 per cent. of gypsum, added, no doubt, to prevent the "caking" as well as to cheapen. No. 3 contained starch, and Nos. 4, 5 and 6 were probably pure, a difference in amount of moisture would account for the variation in ash. No. 7 contained starch, and probably some other impurity or the ash would have been less from the presence of starch, instead of higher than the average.

ON BECHI'S TEST FOR COTTON-SEED OIL IN OLIVE OIL.

Abridged from the Report of the Commission of Florence appointed to examine "Bechi's Test." See *L'Orosi*, Feb. 1887, p. 37.

TRANSLATED BY JOSEPH W. ENGLAND, PH. G.

Read at the Pharmaceutical Meeting, May 17th.

In a lengthy and exhaustive communication, the Commission of Florence has made public the results of the experiments upon the value of the "Bechi's Test" as a reliable and positive indicator of the presence of cotton-seed oil, fraudulently contained in olive oil. This Commission, appointed in the early part of last year, was as follows: U. Peruzzi, N. Ridolfi and Prof. G. Roster.

The method of Professor Bechi, as used by the Commission and with successive modifications by the author, consists in the subjection of a sample of the suspected oil to the heat of boiling water, after first having added an alcoholic solution of silver nitrate, and amylic alcohol and oil of rape, in the manner and proportions hereinafter indicated.

Take one grain of crystallized silver nitrate, and dissolve in the smallest possible quantity of water (about 1 cc.) and add 200 cc. of alcohol (96°). The addition, also, of 20 cc. of sulphuric ether is a good one, in that it makes the reagent better miscible with the oil to be examined, but it is not necessary. On the other hand prepare a solution composed of 85 parts of amylic alcohol and 15 parts of oil of rape seed. These reagents should be made as needed and not kept on hand for any length of time.

Now, to apply the test, Prof. Bechi takes 10 cc. of the oil to be examined, adds 1 cc. of the alcoholic solution of silver nitrate and then from 8 to 10 cc. of the mixture of amylic alcohol and oil of rape; agitating strongly and then heating on a water-bath for 5 or 10 minutes.

In the case of pure oils, the color remains the same, as it was after the addition of the reagents. In the event that sophistication has been practiced with cotton-seed oil, there will be produced a brownish color, or turbidity, of a varying grade, from a very light brown to a deep maroon or black, according to the quantity of cotton oil present.

With these data furnished by Prof. Bechi, and after having assisted in experiments made by him in support of his method, the Commission instituted a series of long and diligent personal experiments, numbering over 200, in the chemical, biological and hygienic laboratory of the Royal Institute; adhering strictly to the rules as laid down, measuring exactly, in each instance, the quantities of oils and reagents, and using tubes of equal diameters or, in one word, employing the same conditions in all experiments, in order to render the result truly comparative.

The oils used were furnished in part by Prof. Bechi and in part by this Commission; looking, especially, for those olive oils of whose genuine nature there could be no possible doubt and then, secondly, taking good olive oil containing cotton oil. Several of the olive oils were from other countries (Spain, France, Tunis, Dalmatia and Malta, etc.), but the greater number were from various parts of Italy. Some were recent and some old, others pure of 1*a*, 2*a*, 3*a*, quality and others were rancid.

In order to ascertain if the reaction outlined by Bechi was peculiar to cotton-seed oil addition, alone, the Commission found it necessary to extend their experiments upon other oils, vegetable and animal, alone and admixed with pure olive oil.

Every experiment made was in doubles or triples, that is two samples of the oil (marked No. 1 and No. 3) and another sample of the oil (marked No. 2), which had added to it cotton-seed oil in a certain proportion; subjecting No. 1 and No. 2 samples to the heat of boiling water, after the addition of the reagents and leaving No. 3 sample without exposure to heat, in order to compare the colors of Nos. 1 and 2 with that of No. 3. The experiments were then especially directed toward the mixture of olive oil with oil of cotton-seed. The

proportion used for the mixture was, generally, 20 per cent. of the latter oil. The Commission held, that, if the method of Prof. Bechi will determine any such falsification, it is more than sufficient for any exigency, inasmuch as the fraud practiced is always in much larger proportion. The experiments were grouped under five series.

Series A.—Cotton seed oils of various origins.

Eleven samples of oils from the following markets were used:—1. London; 2, New Orleans; 3, Augusta; 4, Louisville; 5, Sample (8 years old); 6, English (Hirsch); 7, Thorn; 8, Maginnis; 9, Planter's; 10, Aldigè; 11, Creole. All these oils treated with the "Bechi test" gave a most intensely brownish color, that exhibited no appreciable variation in shade, according to the origin of the product. The experiments were then repeated upon the oils, using 2 cc. of oil of cotton to 8 cc. of olive oil. The olive oil used was from Pons of Scandicci, upon whose genuineness there can be no question.

Series B.—Pure olive oil, alone, and admixed with oil of cotton.

The series of experiments here outlined were based upon the first, second, and, in some instances, the third quality of 48 oils, giving also the origin of each oil. The samples were subjected to comparative tests, alone, and then admixed with 20 per cent. of Hirsch's English cotton seed oil, the most abundant in Italian markets; in every instance the 48 olive oils, alone, were negatively affected by the reagents, but the instant cotton oil was admixed, and the test then applied, the result was promptly given by the formation of the deep brownish colors in every instance.

Series C.—Various oils, alone, or mixed with Hirsch's English cotton seed oil.

The oils here examined are 25 fixed oils of different qualities, liable to be used as an adulterant. They are, for example, oils of rape (Germany, Milan, Marseilles, etc.), sesame (Levant, Georgia, Bombay, Paris and Grasse), peanuts, poppy, linseed, cocoanut, castor, almond, peach-seed, and cod-liver, and the results show that, in every case, there was no appreciable change with the reagents, but if prior to the application to the test 20 per cent. cotton oil was added, the characteristic color of the reduction was formed.

Series D.—Pure olive oil with other fixed oils, alone, and with cotton oil.

These experiments were made to ascertain if the presence of other fixed oils than cotton seed, in a mixture, would have any modifying

influence upon the reaction, so characteristic with oil of cotton. It is sufficient to say, that the results show that they have none, and the Commission find that the test is therefore limited to that fixed oil alone. The cotton seed oil was added in 20 per cent. proportion, when used with both oils of olive and benne (in the secondary tests), which latter two were evenly divided (i. e. 40 per cent.), while the oil of sesame was added in equal parts to olive oil, prior to the application of the primary tests.

Series E.—Rape oil of different origins, alone, and mixed with cotton oil.

The Commission, in view of the importance that oil of rape obtains in the application of Bechi's test, examined seven oils of various qualities, derived from different provinces. From these experiments, the assertion is made, that while several of the finest samples in the pure, undiluted state, furnished a noticeable change in the formation of a reddish-brown color, this was always made very much darker if 20 per cent. of cotton seed oil was previously added; and, on the other hand, if the rape oil examined was previously diluted with pure olive oil or amylic alcohol, as, for example, in the proportions used by Prof. Bechi in his test, *no* change whatever was evinced.

Finally the Commission wishing to see if a variation of the proportion of the reagents would more clearly demonstrate results, used a stronger solution of silver nitrate, and found that the brownish color could be made to vary from brown to black, according to the quantity of the silver salt added. After numerous experiments, they decided that the original proportions were the best ones to adopt, in that the test would be much more delicate, and would not, under any circumstances, be caused by the rape oil.

To examine olive oil for admixed cotton oil, with Bechi's method, the Commission recommend the division of the suspected sample into three parts, as follows:

No. 1. Tube of the suspected oil and reagents.

No. 2. Tube of the suspected oil and 20 per cent. of cotton oil, and the reagents.

No. 3. Tube of the suspected oil and reagents.

Now expose tubes No. 1. and No. 2. to the heat of boiling water for 5 or 10 minutes, but do not heat tube No. 3; use it simply as a guide to see if No. 1. remains unaffected by heat or becomes colored. If the sample is pure, the oil will remain unchanged, that is the same in

appearance as No. 3., while No. 2. acquires the characteristic color. If the oil in tube No. 1. has been sophisticated with cotton oil the brownish coloration will soon appear, while tube No. 2. will be a much deeper brown; evidently showing that the brownish color is due, in part, to the quantity of cotton seed oil present, as well as the proportion of silver nitrate, and oil of rape.

From all that has been presented and more especially from the clear, concording and uniform results, obtained in the experiments herein detailed, it is evident that the method proposed by Professor Bechi, used with care, and in the manner indicated, has not failed the Commission in a single instance and they feel that they cannot do less, than to most strongly urge its general adoption, as a reliable and positive indicator for the existence of cotton seed oil in olive oil, fraudulently added.

As a matter of interest, the translator has made some experiments and prepared, for your inspection, a number of samples, showing the results with the "Bechi Test," upon a collection of fixed oils in general and some pure olive oils in particular.

No. 1. Pure olive oil expressed from the imported fruit, by Mr. Rich. M. Shoemaker, kindly furnished by Professor Maisch.

No. 2. Is No. 1. tested; darker, somewhat reddish, but transparent.

No. 3. Is No. 1. with one half cotton seed oil, tested; deep brownish-black turbidity and partial precipitate.

No. 4. Olive oil, imported in Florence flasks, obtained from Prof. Maisch.

No. 5. Is No. 4. tested; it bears a close resemblance to No. 2.

No. 6. An equal mixture of No. 4. and cotton seed oil, tested; resembles No. 3.

No. 7. Mestrezat olive oil.

No. 8. The same, tested; slightly reddish, transparent.

No. 9. Is No. 7. with cotton seed oil, tested; turbid, deep brownish-black, partially precipitated.

No. 10. Pure rape oil, tested; it is not unlike, in appearance, that of No. 8.

No. 11. Cotton seed oil, made by the Union Salad Company.

No. 12. The same, tested; deep black turbidity and precipitate.

No. 13. Oil of sesame.

No. 14. The same, tested; slight reddish tinge, but perfectly transparent.

No. 15. Expressed oil of black mustard seed, 23 years old.

No. 16. The same, tested; no change.

No. 17. Oil of linseed, tested; remains unaltered.

No. 18. Castor oil, tested; has acquired a slight reddish tinge.

No. 19. Cod liver oil, tested; shows a strong reddish tinge, but no turbidity.

In the original article no theory is advanced concerning the chemical reaction that takes place in the application of the "Bechi test," but it seems highly probable that the change is due to a reduction of the silver nitrate to the state of oxide, through the presence of the peculiar yellow coloring principle present in cotton seed oil. The product, after the testing is finished, measures 11·5 cc. showing that the residue is simply a mixture of the suspected oil (10 cc.) and oil of rape (15 cc.), while the alcohols have been totally dissipated, by the heat of the water-bath. The utility of the rape seed oil, in the decomposition, is not explained and whether the amylic alcohol, through any chemical change, exerts any influence is also an unsolved problem.

NOTES ON A FEW DRUGS.

By G. M. Beringer, Ph. G.

Read at the Pharmaceutical Meeting, May 17.

Having occasion to examine some *oil of erigeron* recently, the spec. gravity was carefully ascertained, at the temperature of 60° F., with the 1000 grain bottle; it proved to be 0·8454. The gravity given by the U. S. Pharmacopœia is 0·850; Professor Procter's experiments in 1854, place it at 0·845. The figures correspond very closely and within a limit that may be accounted for by the age of the oil.

Oil of Peppermint. Three samples of American oil recently examined, showed varying densities; Hotchkiss' oil sp. gr. ·9074, rich in menthol; one of A. M. Todd, sp. gr. ·9074, not quite so rich in menthol; and a sample of another Western distiller sp. gr., ·9112, contained but a small quantity of menthol, being undoubtedly a skimmed oil. These figures correspond closely with the statement of Mr. Todd in his article on the subject of "Oil of Peppermint," read at the last meeting of the American Pharmaceutical Association. Mr. Todd states that pure oil of peppermint is never below 0·908 sp. gr., nor when fresh and soluble above 0·917, so that the difference formerly allowable, that is from 0·840 to 0·950, is made ten times as small.

Oil of Bay. The sp. gr. of this oil is stated in the U. S. Pharmacopœia, as about 1·040. A sample obtained from an American distiller, who guaranteed the purity, showed a sp. gr. of 0·9750; another sample from a St. Thomas distiller, showed 0·9945; both of these oils were of fine odor and appearance, and would indicate that the Pharmacopœia had stated the sp. gr. a trifle high.

Popp's stomach powders. At the suggestion of a customer for whom I had purchased the article, I made an examination of the same and found each paper contained about thirty grains of very coarsely powdered sulphide of iron; two dozen of these powders being put up in a box for which $1.25 was asked. This was to me a novel use of sulphide of iron.

Ground Flaxseed. The U. S. Pharmacopœia requires that ground flaxseed shall yield not less than 25 per cent. of fixed oil when extracted with disulphide of carbon. A sample recently ground to order, yielded thirty per cent. when thus treated, and another lot offered in the market, gave thirty-one. This would show that the requirement is not as full as it should be.

Job's tears. Coix Lachryma, *Lin.*; nat. order Graminaceæ. These fruits are being again called for occasionally by fond mothers for the purpose of making into necklaces under the impression that children wearing such ornaments will cut their teeth more easily. The peculiarity of this grass is the formation of the pistillate spikelet being one to two flowered, inclosed within a bract which becomes a round bony shining involucre.

THE FLUORESCENT PRINCIPLE OF WILD CHERRY BARK.

By R. Rother.

A decided bluish fluorescence occasionally appears in syrup of wild cherry bark; but by the use of a menstruum, rendered alkaline with ammonia its appearance is invariable. The writer has for some time past been in the habit of employing an ammoniacal menstruum in the preparation of syrup of wild cherry and has never failed to notice the peculiar aspect of the product.

In order to ascertain something further about the nature of this result a considerable quantity of wild cherry bark in coarse powder was percolated with an aqueous menstruum, one-eighth of which being alcohol, and one-sixteenth of it being 18 per cent. ammonia water. On

continuing the percolation for some time it was observed that each new portion of menstruum poured on the top of the column in the percolator was instantly pervaded by the fluorescent tint without apparent diminution of intensity. This indication pointed to the fact that an almost vanishing quantity of the fluorescing body could provoke its characteristic phenomenon and also that its total amount contained in the bark was perhaps incomparably small, but difficult of extraction.

On treating the first half of the percolate with diplumbic acetate a voluminous light-brown precipitate resulted leaving with a sufficiency of the reagent a colorless solution, in which, however, the fluorescence appeared undiminished. The second half of the percolate was much darker brown than the first half, and also possessed a very decided predominance of free ammonia. On treatment with diplumbic acetate until the solution became colorless, a dark green precipitate resulted. The filtrate off this showed an unchanged fluorescence. It was distinctly ammoniacal, but absolutely free from lead. Treated with mercuric chloride in excess, a dingy yellow precipitate resulted whilst the solution ceased to fluoresce. The filtrate gave with ammonia a white precipitate of mercurammonium chloride and a non-fluorescent liquor. This result showed that the fluorescing body was now all contained in the yellow mercuric chloride precipitate. This precipitate, after washing, readily dissolved in ammonia to a colorless solution only faintly fluorescent. On spontaneous evaporation abundant crystals were obtained. These remained unaffected by either chloroform or ether but readily dissolved in alcohol, which, after dissipation, left them in their original form. Viewed under the microscope with a half-inch power, these crystals were seen to be well defined aggregates of slender columns intercrossing at right angles. In such portions of the field where the accumulation was sparser the square arrangement had degenerated into curves, owing probably, to inequalities in the surface of the slide. The crystals were void of polarescence. The writer here uses the term polarescence, as indicating the property of differentiating polarized light. Of course, the meaning of the term stands in no relation to fluorescence. The color effect in polarized light is due to double refraction and subsequent interference which is greatly aided by thin plates of selenite and mica. But fluorescence is an absorption phenomenon.

Another portion of the fluorescent filtrate from the lead precipitate

was evaporated to a syrupy residue having a light red tint. This residue was in large part acidic ammonium acetate. It dissolved readily and completely in alcohol. But chloroform and ether dissolved it only partially. Their solutions gave, on spontaneous evaporation, pasty amorphous residues which after about 8 hours become wholly and very distinctly crystalline. On diluting the original acetic residue with water, boiling it for some time with excess of dilute sulphuric acid, and again concentrating it, a brown red pasty sediment formed. This readily dissolved in ammonia, and after supersaturating the alkali with chlorhydric acid and removing all the ammonium sulphate and most of the chloride with alcohol, a brown-red residue was again obtained from the alcoholic solution after concentration. Treatment of this with ether yielded a faintly red solution which, on spontaneous evaporation, gave a viscid residuum, becoming wholly and decidedly crystalline after about 8 hours. These crystals promptly dissolved in chloroform, ether and alcohol, and were also soluble in water. The alcoholic and aqueous solutions became strongly fluorescent on the addition of ammonia. The red pasty remainder left undissolved by the ether was easily and perfectly soluble in ammonia without fluorescence.

The crystals obtained by means of ether in this instance were identical in properties and appearance with those secured by the same agency from the acetic residue in the first instance. They formed, in slender branched filaments, upwards to one inch in length. Viewed in oblique incident light, they displayed decided rainbow tints, which may result from prismatic dispersion, but, were probably, the iridescence of diffraction. Under the microscope with a one-inch power, these crystals showed no prismatic form although their appearance was very fine. A merely incipient polarescence was observable, which, however, develops with the age of the crystals into an excellent appearance.

The proportional quantity of this crystalline constituent of wild cherry bark is exceedingly small. Without the fluorescing property, as a guide, it would have been practically impossible to detect and isolate it. Judging from its crystalline form it does not appear to be mandelic acid, a decomposition product of amygdalin. It may, however, be an analogue, or a substituted derivative of it. This conjecture leads to the legitimate question, whether or not, it is amygdalin as such, from which the benzoic aldehyde and cyanhydric acid of syrup of wild cherry results.

AN ANALYSIS OF THE LEAVES OF GAULTHERIA PROCUMBENS.

By Frank W. Droelle, Ph. G.

(Abstracted from the Author's Inaugural Essay.)

A proximate analysis was made of the finely ground leaves, after they had been separated from the stems, with the following results:

Volatile oil	·50 per cent.
Resin and wax	2·50 "
Resin soluble in ether	2·15 "
Chlorophyll, with small amounts of arbutin, urson and tannin	2·75 "
Tannin	5·45 "
Chlorophyll, arbutin and ericolin	3·80 "
Mucilage	2·90 "
Glucose and dextrin	3·56 "
Organic acids	3·25 "
Albumenoids	4·54 "
Pararabin and allied substances	2·20 "
Loss by treatment with chlorine	6·35 "
Moisture	8·60 "
Ash	4·20 "
Lignin and cellulose	45·53 "
Total	98·18 "

The moisture and ash were determined in the usual way, and a qualitative analysis of the latter showed the ordinary ash constituents. Fifty grams were taken for treatment with solvents. Petroleum spirit extracted 3·00 per cent. of a soft solid substance, which, in addition to volatile oil, was composed largely of resin with a small quantity of wax.

Stronger ether extracted 4·25 per cent. of a glossy black soft solid of an agreeable odor, composed of chlorophyll with a resin, probably identical with the resin dissolved by petroleum spirit on account of the volatile oil present. Arbutin was found in small quantity in this extract, being readily detected by phosphomolybdic acid. By treating the ethereal extract with water, dissolving the insoluble residue in hot absolute alcohol and evaporating, there was left a resinous mass which on washing with a little ether and recrystallizing from alcohol left a yellowish resinous mass containing crystals which sublimed on heating and gave a yellow color with nitric acid, indicating the presence of urson. Tannin was also found in the ethereal extract, but gallic acid was sought for with negative results.

The absolute alcohol extract amounted to 9·90 per cent., and contained 5·45 per cent. of tannin, which was estimated by both acetate of lead and acetate of copper. A separate determination by means of gelatin and alum gave somewhat higher results.

There were also found arbutin and ericolin, confirming the work of Oxley (1872.)

A small amount of arbutin was prepared by taking 1000 grams of the drug, extracting with hot water, treating the solution with lead hydrate to remove tannin, and with H_2S to remove lead. The filtrate was evaporated to a soft extract, treated with alcohol, and the alcoholic solution set aside. Crystals of arbutin slowly formed, but the amount was considerably smaller than was expected.

Both the ethereal and alcoholic extracts were tested for alkaloids with negative results. Starch and calcium oxalate were also shown to be absent.

SYRUP OF TOLU.

EDITOR AMERICAN JOURNAL OF PHARMACY:—I have read with interest the article by F. Stevenson on Syrup of Tolu, in the May issue of the JOURNAL, and would like to add my little experience in the manufacture of this syrup. I think the pharmacopœial process can be improved upon. The process which I have used for some time —and for which I am indebted to Prof. Remington—is this: For making twenty-five ounces of syrup, take one ounce of Balsam of Tolu, one pound of granulated sugar, and water which has been previously filtered through animal charcoal, enough to make twenty-five ounces (these are essentially the quantities directed by the U. S. P.); rub the Tolu to a fine powder, aided by some of the sugar, and mix this with the remainder of the granulated sugar; now prepare a percolator by placing a piece of cotton in the neck, pack the powder in it, pour in the filtered water and receive twenty-five ounces of percolate. As seen, this is simply a process of cold percolation, but if carried out as described, will furnish a beautiful, clear and highly flavored syrup, which is so desirable. This formula, I am sure, cannot fail to give satisfaction.

Yours,

W. H. HOSTELLEY.

Philadelphia, May 7th, 1887.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Automatic filtration.—A simple contrivance for this purpose is described by Prof. Dr. O. Billeter, in *Chemiker Zeitung*, 1887, p. 509. The liquid is put into a bottle which is closed by a twice perforated cork. Into one opening a syphon is inserted, the outer arm of which is not much longer than the inner one, and ends in the funnel. A straight tube open at both ends is inserted through the second opening, and its lower end is placed on a level with the height of the liquid to be reached in the funnel. The syphon is filled by carefully blowing through the straight tube, after which filtration proceeds without further attention. Obviously the liquid may be heated or the funnel connected with a vacuum pump.

The apparatus, variously modified, is an old one, but does not appear to be used as frequently as it deserves to be.

A new acid in urine has been observed by Dr. Kirk (*Brit. Med. Jour.*). It was prepared by washing the concentrated urine with ether to remove resin-like compound, then adding to the urine dilute hydrochloric acid, again shaking with ether and evaporating. The prismatic crystals had a strong aromatic odor, and a brown color, but shining colorless needless could be seen scattered here and there. Dr. Kirk proposes to call it *urrhodinic acid.* In its behavior to solvents and in some of its reactions (Fehling's solution, ferric chloride, etc.) it resembles Dr. Marshall's *glycosuric* acid (see Amer. Jour. Phar., March, 1887, p. 131–136), and seems to be identical with the latter, but in a still impure condition. It appears to be a decomposition product of a nitrogenated body, which the author is engaged to prepare in a pure state.

Tyrotoxicon, the poisonous compound isolated from certain cheeses, milks and creams by Prof. V. C. Vaughan (see Amer. Jour. Phar., 1886, p. 342 and 452) has been further studied by him and F. G.

Novie (*Med. News*, April 2, 1887, p. 369). The explosiveness of the platinic chloride compound lead to its comparison with similar azo-compounds and it seems likely that the poison is diazobenzol butyrate or lactate. From unwholesome oysters a body was obtained which likewise agreed with the tests for diazobenzol. The investigations are continued by the authors.

Acid morphine meconate.—The experiments of D. B. Dott (*Phar. Jour. and Trans.* Feb. 26, 1887, p. 690) render the existence of such a compound very doubtful. Morphine and meconic acid, in various proportions, dissolved in anhydrous alcohol and evaporated, leave an amorphous hygroscopic residue, which is extremely soluble in water and quickly combines with its water of hydration, when the neutral meconate with $5H_2O$ crystallizes out, even in the presence of sufficient acid to form the bimeconate.

Toxic dose of atropine.—One-twentieth of a grain of atropine taken in a few divided doses during a day is regarded as a perfectly safe dose. Dr. C. Baum reports in *Phila. Med. Times* the case of a lady, who for acute coryza, had been ordered two granules of atropine sulphate grain each, which were taken in two hours. Toxic symptoms appeared after the first dose, which were greatly aggravated after the second dose, but yielded to appropiate treatment.

Eau de Rabel, Fr. Cod., is a mixture of oil of vitriol 1 p., with alcohol 3 parts, colored by the addition of 1 per cent. of red poppy leaves. T. Gautrand (*Thèse*, Montpellier, 1887) has studied the etherification of this mixture under various conditions, by determining volumetrically the total amount of free acid as H_2SO_4, and gravimetrically the total sulphuric acid, after decomposing the sulphovinic acid by evaporation and ignition with pure potassium nitrate; the difference between the two determinations indicate the H_2SO_4 ($\frac{1}{2}$) present as sulphovinic acid. He found that the limit of etherification in this preparation corresponded in neutralizing effect to 7·2 per cent. H_2SO_4, or to the formation of 18·5 per cent. of sulphovinic acid. The main factor affecting the rapidity of the change is the temperature, the limit being reached in summer in about two months, in winter in more than four months, and at 83° C., the boiling point of the mixture, in less than half an hour. Direct sunlight and the coloring matter do not influence the limit nor the rapidity of the change. In the course of several years a retrograde change takes place, the sulphovinic acid being partly decomposed.

Mixtures of equal weights of sulphuric acid attain in six days the limit of change, corresponding to 12·1 per cent. H_2SO_4 in neutralizing power. A mixture of 1 part of sulphuric acid and 5 parts of alcohol forms in about ten months, sulphovinic acid corresponding in neutralizing power to 5 per cent. H_2SO_4.

Liquor Ferri chloridi.—The commercial article was found by Geo. Buchner (*Chemiker Ztg.*, 1887, p. 417) to be often contaminated with arsenic, probably as arsenic acid or ferric arsenate. The pharmacopœias do not give a test for this impurity, which is readily detected by treating a small quantity of the liquor with zinc and hydrochloric acid, when the hydrogen gas will produce a yellow, brown or black color upon paper moistened with silver nitrate. Ferric compounds, prepared from such a liquor, will likewise contain arsenic.

In testing for arsenic by Marsh's process the author directs attention to the necessity of heating the reduction tube sufficiently, since by the use of a Bunsen burner an arsenical mirror will be readily obtained, while with the same materials the mirror may not make its appearance on prolonged heating with a Berzelius' spirit lamp.

Ichthyol.—A tarry product is obtained by the dry distillation of a bituminous mineral containing fossil fish; on treating this with sulphuric acid and subsequently neutralizing with sodium carbonate, *ichthyosulphate of sodium* is obtained, known also as ichthyol; it is tar-like in appearance, has a bituminous odor, on heating becomes charred and acquires the odor of liver of sulphur. Its aqueous solution is almost neutral, turbid, brown and has a green fluorescence; it dissolves partly in alcohol and in ether, but is completely soluble in a mixture of the two solvents and in benzol, and is almost insoluble in petroleum-benzin. It has been used internally, the odor being partly covered with coumarin or vanilla, but mostly externally in rheumatism, erysipelas, burns, swellings and in various eruptions of the skin; the *ointment* made with petrolatum, contained from 2 to 50 per cent. of ichthyol. Unna administered it to adults in doses of 1 to 2 gm., and favors its internal use in all affections of the skin.

Absorbent wool, a by-product in the manufacture of wool-fat or lanolin, is coming into use as a substitute for absorbent cotton, over which it is said to have the advantage of greater absorbing power for liquids, and of much greater elasticity.

Mercuric phenate, $C_6H_5.OHg.OH$, is prepared by precipitating in aqueous solution 271 parts of mercuric chloride with 132 parts of

crystallized potassium phenate, and washing the orange-red precipitate, which has only a very faint odor of phenol, and has been given in doses of about ·02 gm. ($\frac{1}{3}$ grain).

Collodium corrosivum is prepared by dissolving 1 part of corrosive sublimate in from 30 to 40 parts of collodion (12 to 15 grains in 1 fluidounce). It may be used in those cases where the gradual effects of mercuric chloride are needed, and has been used more particularly for the removal of warts, the application being made once a day.

Collodium antisepticum, which may be used like ordinary cotton, is recommended (*Jour. Médec.*, December 26, 1886) to be prepared from powdered mastic 3 gm., powdered narcotine 1 gm., balsam of Peru 1 gm., and chloroform 5 gm. Strips of linen or silk soaked in this solution, form an excellent adhesive plaster.

Oleum cinereum is a mercurial preparation used by Dr. E. Lang (*Wien. Med. Woch.*, 1886) in syphilitic complaints. It is prepared by triturating, in a cool place, lard, oil and mercury until the latter becomes uniformly suspended, the finished preparation to contain 20 per cent. of the metal. It is used as a local dressing; also as an injection to enlarged glands, 0·01 to 0·02 cc. being given once a week or in a fortnight. For use it is melted by the warmth of the hand.

Unguentum cretæ præparatæ is recommended by Dr. Dyce Duckworth (*Practit.*, Jan., 1887) as an application in erysipelas. It is prepared from equal parts of prepared chalk and lard, and to each ounce of the ointment is added 30 grains of carbolic acid. An equally serviceable ointment is obtained with precipitated calcium carbonate, and this is of a pure white color.

Hair Tonic.—The following local application has been recommended by Prof. Bartholow: Fluid extract of pilocarpus and tincture of cantharides, of each, f℥ss; glycerin and petrolatum, of each, f℥j. —*Coll. and Clin. Rec.*, May, 1887.

Tilbury Fox uses in incipient baldness a wash composed of tinct. nux vomica, ℥iv; tinct. cantharides, ℥ijss; lanolin, ℥ijss; acetic acid, ℥iv; and rose water, ℥vj.—*Med. News*, Jan. 8, 1887.

Oil of erigeron has been observed by Dr. Bartholow (*Physic. and Surg.*, April 1887,) to check the waste of albumen, to lessen the irritability of the bladder in cystitis, and to afford considerable relief in bronchial catarrh and similar affections. It was usually given in doses of five drops, every three or four hours.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

TERPIN is now so largely called for in Paris that unusual efforts are made to supply it. In one of the laboratories, so says the *Union Pharm.* for April, undue haste led to a vigorous explosion. The mixture used in the manufacture consists of 72 litres of the oil of turpentine, 50 litres of alcohol, and 17 kilogm. of nitric acid. The liquid is usually cooled rapidly in stone jars set in water, but as the demand was great, and the jars were all full, a supplementary mixture was poured in a cask, set in cold water, to cool off! The wood did not conduct the heat away rapidly enough, and the explosion was very violent; the cask was driven through the roof, where it burst, scattering its contents throughout the laboratory. No one was injured, strangely enough, but the circumstance contains a lesson for manufacturing chemists to remember. Eyes are valuable to druggists.

NITROUS ACID VAPORS.—A communication has been sent to the Academy of Sciences claiming great success in treating the mucous membranes of the respiratory passages, by a means which most chemists will regard as queer. The remedy consists in pouring fuming nitric acid on a copper plate and inhaling the fumes.

IODINE REAGENTS.—Chibret and Izarn (*Rev. des Sci. Méd.*, April 15), explain a new mode of using Lugol's mixture in seeking for fortuitous alkaloids and leucomaïnes in human urine—matters in which the wise physician often seeks the aid of the analyst. They found that the unvarying reaction in the presence of alkaloids, gave rise to a green fluorescence, and that this acquires an exceptional visibility under the solar ray or in the lantern. The temperature of the liquid is important. Urine which shows nothing when emitted, gives a clearly perceptible reaction when cold. A concentration of the usual reagent into the following formula gave the best results: Iodine 8; potass. iod. 8; water 10. Urine emitted eight hours after waking, showed five times the quantity of alkaloids found at other seasons, thus confirming Bouchard's observations on the maximum toxicity of alkaloidal urines.

VULCANIZED RUBBER INSTRUMENTS undergo chemical changes which in a few months render them useless. They become roughened, and white spots and patches appear, which gradually extend into the substance of the articles. In the *Jour. de Pharm. et de Chimie*, M. Balland attributes the changes to a very gradual production of

sulphuric acid by means of the moisture in the air uniting with the sulphur contained in the rubber, and, in a previous note, indicated the quantity given off in a chemical analysis in which these instruments were used. The action of the acid upon the instruments can be neutralized by occasional washings with water made slightly alkaline. Drainage tubes treated in this way, five or six times a year, will preserve their elasticity and color. He has remarked the length of time laboratory tubes will last when used as siphons.

DANGER IN SANTONIN, even when given in moderate doses, was reported some weeks since in the *Lyon Médical* to have been observed so frequently that the matter has been inquired into by the *Rép. de Pharm.*, with the following results. The effects of white santonin were more toxic than that which had become yellow through exposure to sunlight, though the latter did not show any diminution in its therapeutic properties. Lawre thinks that the dose for a child of less than two years should not exceed 0·05 gm. In all cases it should be associated with a purgative—calomel, for example—to facilitate its elimination. "Santonin is innocuous or toxic," he says, "in proportion to the rapidity with which it may be eliminated, and this varies in individuals." Lewin and Caspari recommend that it be "administered in oily solutions. In this form it is absorbed by the intestines slowly enough to permit a direct and prolonged contact with the worms."

ESCHSCHOLTZIA.—In the *Bull. Gén. de Thérap.* (April 30), Stanislas Martin advises chemists to make a careful investigation of the Eschscholtzia californica in order to separate the unknown active principles to which it owes its calmative action. The character of the sedative effect following the use of eschscholtzia, is said to be superior to that of other papaveraceous plants, such as Sanguinaria canadensis, Papaver album, etc., and, so far as clinical experiments have extended, it seems likely to be preferred to codeine. Martin and Prudhomme will soon enter upon its investigation. American chemists have an opportunity to forestall them.[1]

FILTERING PAPER is so often adulterated with sulphate of calcium, says M. Padé in the *Jour. de Phar. et de Chim.*, that analysts should test it carefully. Papers weighing 13.2 gm., gave when incinerated,

[1] In 1844 Walz discovered in the root of this plant sanguinarine, and two other alkaloids. The herb contains the two last alkaloids, and in autumn also sanguinarine. Editor AMERICAN JOURNAL PHARMACY.

1.374 gm. of solids constituted chiefly of the lime. A discovery of the fact led to a modification of the official statements concerning the adulteration of wines in France.

VINUM FERRATUM AMARUM.—This preparation forms a component part of a formula which has been largely called for in Paris of late on account of its great success in the treatment of anæmia, especially where the latter is deeply seated and occurs with anorexia. It appears in the *Ann. Clin.* of Masius, as follows: Vini ferrat. am. 120 gm.; Tr. nucis vom. 8 gm.; sol. Fowleri 4 gm. (℥i. t. i. d., after eating). The formula for vinum ferratum amarum used in the above is given in *Le Prog. Méd.*, April 9th. American physicians, it is said, are likely to prescribe it. Cinchora bark, 300; gentian, 200; iron citrate, 300; Marsala wine, 11,700; brandy, 900; alcohol, 900; essence of orange, 18; sol. ferric sulphate (10 per cent.), 1800; sugar, 1800; ammonia q. s. The essence, with a little alcohol is mixed with the wine and brandy. With this, macerate the cinchona and gentian until 13,500 gm. have been displaced with water. Dilute the solution of ferric sulphate with twice its weight of water, and add ammonia to excess. Wash the precipitate and let it drain; mix this with the tincture obtained, stirring often, until a yellow color is obtained, which does not darken with tincture of ferric chloride. Then dissolve in it the ferric citrate and the sugar, and dilute to 14,400 gm. Thirty grammes contain 0.60 cinchona; 0.40 gentian and 0.60 citrate of iron.

COLCHICINE. Some very important researches as to the toxicity of colchicine, are given in the *Jour. de Méd.* 1. The symptomatic tables, and the microscopic aspects show that colchicine acts as an irritant poison, powerful enough to make its action felt in all the organs, but whose predominating influence is exerted upon the digestive tract and the kidneys. 2. The minimum toxic dose varies according to the mode of administration. Hypodermically it is 0.000571 gm.; by the stomach, 0.00125 gm. per kilo. of the living body. 2 The toxic action is more rapid in hypodermic injections. 4. It is eliminated by many emunctories—especially by the kidneys—but the work is slow; hence, non-toxic and relatively weak doses (0.00016 gm.) per kilo of body weight, may cause death in five days. 5. It congests the articular extremities and the medulla osseum. 6. In therapeutic doses it acts as a purgative or diuretic (according to strength), in consequence of its congestive and irritative action on the kidneys and the digestive tract. 7. Man is three times more sensitive to its action than cat or

dog. Diuresis is caused by 2 or 3 millig'm. and purgation by 5 millig'm. 8. It augments the excretion of uric acid, and diminishes its quantity in the blood. Its extremely toxic nature suggests great caution in its use.

CONIINE BROMHYDARTE has been used successfully for rheumatismal tetanus. After one injection of 0·0025 gm. of the alkaloid (to a child of ten years,) the trismus diminished greatly, and the violence and frequence of the attacks were lessened after the second dose. After five doses all of the characteristic symptoms ceased. The action of the remedy was especially shown in the relaxing effects on the terminal extremities of the motor nerves. The writer (*Bull. Gén. de Thérap.*; *Centralbl. Med.* April 15,) noted a marked diminution of the cutaneous and tendinous reflexes, and in the rapidity and irregularity of the respiration—followed by augmentation of the salivary secretion—after each dose of the medicament. See also AMER. JOUR. PHAR. 1886, p. 357.

EFFECTS OF NARCEINE.—Brown-Sequard and Laborde experimented a good while on the physiological effects of narceine before they found out that "there was something wrong." Then the chemist, Duquesnel, was called in and discovered that the narceine was extremely impure. Pure narceine produces a much quieter sleep than morphine.

COMPOSITE PILLS.—The *Bulletin Commercial*, April, states that Dr. Granville's idea of making "concentric composite pills," i. e., putting the medicaments in layers, so that the outer one will become dissolved in the stomach while the inner drug acts upon the intestine, was invented by Le Couppey, whose pills were exhibited in 1878, and consisted of iron and extract of cinchona separated by a thin layer of sugar, the whole being coated with sugar. Jisy's idea for preserving certain ferrous salts, like the carbonate and iodide, was also a good one; he dried and powdered separately the salts yielding those compounds, mixed them, and at once surrounded them by gelatin in the ordinary way.

FRENCH WINES.—The small vine growers of France now sell their whole product. Wines for their personal use, are made usually from raisins, but they color them just as carefully as though they were to be offered for sale. An effort is being made to stop the sale of wine colorants, and the question arises, "Cannot a Frenchman color wine for his own consumption?

GLEANINGS FROM GERMAN JOURNALS.

By George H. Ochse, Ph. G.

Powdered yellow wax is a good excipient for pill masses containing balsams or ethereal oils. Wax is readily powdered by triturating with an equal quantity of granulated sugar, adding several drops of alcohol. Two parts of this mixture and a small quantity of starch etc., yield with one part of oil or balsam a good, non-voluminous mass.—*Pharm. Centralhalle*, XXVIII—75.

Gelatin Bougies, Suppositories Etc.—The best gelatin for pharmaceutical uses is the French silver gelatin No. 1. The proportions of gelatin, glycerin and water cannot be the same for all preparations because the action of the medicament on the mass, diliquescence or coagulation, must be taken into consideration.

Where gelatin preparations are frequently dispensed it is best to have a definite mass in stock. This is made in large quantities. After removing the scum from the solution it is poured into suitable bottles and when thoroughly cooled covered with alcohol to prevent it from becoming mouldy. When wanted for use the bottle is placed in a water-bath and the required quantity is poured off. The mass is made as follows:—The accurately weighed gelatin is allowed to macerate over night in distilled water and strained through a sieve. The gelatin adhering to the sieve is collected, the whole placed in a tared porcelain capsule and sufficient water added to make the weight four or five times as much as the original quantity of gelatin used. The capsule is placed on the upper ring of a retort-stand and heated over wire-gauze with a gas or spirit-lamp flame, care being taken not to burn the gelatin. The glycerin is added and the whole evaporated to the consistency mentioned in the following table.

	I. Evaporated to 60 parts.	II. Evaporated to 25 parts.	III. Evaporated to 50 parts.	IV. Evaporated to 60 parts.	V. Evaporated to 104 parts.
Gelatin	20	10	10	10	30
Water	80	40	40	40	120
Glycerin	40	15	20	30	15

The anhydrous mass No. 1 is intended for preparations kept in stock, and for those which are to retain their transparency; mass No. 2, for hygroscopic drugs; No. 3, for suppositories; No. 4, for vaginal balls, ear-almonds, and bougies; No. 5, for crayons or bougies, containing a large percentage of iodoform.

Bougies. Bougies containing sulphate of zinc, sulphate of copper, nitrate of silver, extract of opium, hydrochlorate of morphine, bichloride of mercury, etc., are made as follows: one part of sulphate of zinc, or any of the above-mentioned medicaments is first dissolved in a little water, and then added to 99 parts of mass No. IV, and poured into moulds. If it is desired to make a large quantity of sulphate of copper bougies it is best to mix not more than the mould will hold at a time, because by frequently heating the mass the bougies acquire a yellowish-green color instead of a blue-green.

Bougies of carbolic acid (5 *per cent.*), and similar medicaments soluble in a small quantity of alcohol are made by adding 3 parts of carbolic acid previously dissolved in alcohol to 7 parts of glycerin and 50 parts of mass No. III.

Bougies of iodoform 50 *per cent.*, and of similar medicaments insoluble in water and alcohol by adding 27 parts of powdered iodoform to 54 parts of mass No. V. When taken from the mould the bougies are placed in a drying closet until they weigh about two-thirds of their original weight.

Bougies of ferric chloride (5 *per cent.*), and of similar hygroscopic drugs by dissolving 1 part of sesquichloride of iron in 9 parts of water, and adding to 19 parts of mass No. II.

Alum bougies (2 *per cent.*), 25 parts of mass No. III, and 10 parts of distilled water are liquefied in water bath. To this is added a *hot* solution of 7 parts of alum, 10 glycerin and 5 distilled water. The whole is then evaporated with slight agitation to 35 parts. The mixture becomes thick and turbid on adding the solution of alum, but on heating over a water bath and stirring carefully, the mixture soon becomes clear and transparent. *Hot water* must be added from time to time to replace that lost by evaporation.

Bougies containing tannin ·2 *per cent.* 0·66 of tannin is dissolved in 8 glycerin, and the hot solution added to 39 mass No. II, the whole evaporated to 33. The mass will coagulate on the addition of the tannin solution, but becomes clear when slowly stirred for 5 or 10 minutes on a water-bath. By this process 2 grams of tannin may be incorporated with 5 grams of gelatin. This formula is a very good one, and yields bougies which are very soluble. Schreiber states that he has met with tannin bougies which, on boiling with water for half an hour, did not dissolve.

Bougies of extract of krameria are not made with gelatin but with

white glue. The requisite quantity of extract is dissolved in 40 glycerin and added to the hot solution of 15 glue in 20 water stirring constantly until the mass is evenly distributed.

Bougies of salicylate and chloride of sodium are made by adding the finely triturated chemicals to 30 parts of gelatin mass No. II.

For *rectal suppositories* mass No. III is used excepting for hygroscopic drugs which require where possible an anhydrous mass, either No. I or No. II.

For *vaginal balls* use about the same mass as is used for bougies. Suppositories or balls containing iodide or bromide of potassium, bromide, chloride or salicylate of sodium or ergotin require mass No. II.

Suppositories of chloral hydrate are made with gelatin mass No. II, the chloral being added dissolved in a little water.—*Phar. Rundsch.* (Prag), 1887, p. 101.

In preparing *solution of acetate of iron* Oldtmann collects the precipitated hydrated oxide of iron on a strainer and allows it to freeze; this mass after melting can be readily washed and pressed. Solution of acetate of iron thus prepared is clear and stable.

Liquor ferri dialysati as frequently obtained has not the proper specific gravity. By subjecting it to freezing temperature the water will freeze out. In this way solution of dialysed iron can readily be concentrated without decomposition.—*Phar. Rundschau* XIII, p. 90.

Reactions for Antifebrin, (Acetanilid).—To test antifebrin for aniline Yvon triturates a small quantity of antifebrin with water and then adds hypobromite of sodium. If the antifebrin is pure the liquid remains clear and has a yellow cast; if aniline is present a red-orange colored precipitate is produced, the liquid becoming the same color.

If antifebrin is heated with mercurous nitrate a green coloring matter soluble in alcohol is produced. This reaction can also be used for testing urine. The urine is shaken with chloroform, the chloroform evaporated and the residue heated with a small particle of mercurous nitrate. If antifebrin is present the green coloring matter is produced.—*Ph. Zeitung*, XXXII, p. 53.

Glycyrrhizate of Quinidine.—Hager prepares this compound as follows:—1000 grams of coarsely powdered peeled licorice root are macerated in 1.5 litres of distilled water at about 40° C. for 12 hours, it is then displaced with a mixture of 1.5 litres of distilled water, 70 cc. ammonia water (10 per cent.) and 15 grams of bicarbonate of ammo-

nium and lastly with distilled water until the liquid has a pale yellow color and scarcely perceptible, sweet taste. The mixed liquids if turbid (owing to the presence of carbonate of calcium) must be filtered. To the filtrate is added by agitation a solution of 75 grams of sulphate of quinidine in 500 cc. luke-warm distilled water and 300 grams of hydrochloric acid sp. gr. 1.124. If after the lapse of one hour the solution should have a strong alkaline reaction it must be neutralized with dilute acetic acid. It must be stirred frequently and then put aside for several hours. The precipitate is collected on a wetted linen strainer and washed with cold distilled water, gently expressed and spread on porcelain plates in layers about 1.5 cm. thick and only covering one-half of the plate. The plates are placed in a slanting position so that the liquid can drain off. When dry it is powdered in a cold porcelain mortar. The yield is about 200 grams. Thus prepared glycyrrhizate of quinidine is a grey-yellow powder, of a bitter-sweet taste, insoluble in water and sparingly soluble in alcohol. Acids and alkalies decompose it. Its composition corresponds to the formula $C_{20}H_{24}N_2O_2.C_{44}H_{63}NO_{18}+2H_2O=1577$. It contains 41.09 per cent. quinidine.—*Ph. Zeitung*, XXXI, 641.

ESSENTIAL OIL PAPERS.

By Albert M. Todd.

2. Oils of Erigeron and Fireweed.

The oil of erigeron (oleum erigerontis canadensis) and the oil of true fireweed, (oleum erechthitis hieracifoliæ), are distilled from plants of the most distinct types possible, and seem to be almost as distinct in therapeutic action; both are highly valuable in medicine when pure, but their usefulness has been nearly destroyed and their value little understood since they have been almost universally confounded with each other, both in science aud commerce, and even when not so confounded are rarely met with in a state of purity.

A growing interest being manifested in the subject, I had already made some observations with the oils referred to, which interest was further enhanced by an urgent request from Messrs. J. U. & C. G. Lloyd, that I should make more complete investigations, the results of which might be embodied in their valuable work now in progress on the "Drugs and Medicines of North America." I also

had the pleasure of sending them a full collection of our essential oil plants in the living state, with which to embellish their work; and through their courtesy the plate of fireweed prepared for that purpose, is here shown.

As no tests existed for the identification of the oils, and possessing, fortunately, samples distilled by myself directly from the plants, so that I was able to be positive as to their purity, which is a condition of vital importance; the investigations recorded were made.

The credit of the first researches is due to Prof. J. M. Maisch, which happened through a curious circumstance—that the fields of peppermint had been reported to be contaminated with a weed called "fireweed." This error was the fault of the farmers, who, from a lack of botanical knowledge, gave the wrong name for the plant. Prof. Maisch rightly believing that the contaminating weed was the erigeron canadense, corresponded with various peppermint growers, sending them botanical specimens, that there should be no mistake; which correspondence and specimens I had the pleasure of seeing. The correction of the error was then for the first time made public by Prof. Maisch in an article in the AMERICAN JOURNAL OF PHARMACY for 1870, page 120, as well as in the report on the progress of pharmacy in the proceedings of the Am. Pharm. Assoc. for that year.

The principal object sought in the present article is to establish tests for the identification of the oils rather than to treat of the botany of the plants; but a crude description regarding their general characteristics may be of interest.*[1]

The true fireweed—*Erechthitis hieracifolia*—is seldom found in open fields or by the roadside, growing exclusively in, or adjacent to, clearings where timber has recently been burned. The plant strangely seems to spring spontaneously from the ashes of old log piles soon after their formation, and continues to sprout up for several seasons there-

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[1] A more scientific description of the plants in question may be found in Gray's Hand Book of Botany, as follows:

Erechthites hieracifolia, Raf. (Fireweed.) Often hairy; stem grooved (1° to 5° high); leaves lanceolate or oblong, acute, cut-toothed, sessile; the upper with an auricled clasping base. (Senecio hieracifolius, L.)—Moist woods. Common, especially northward, and in recent clearings, where the ground has been burned over; whence the popular name. July–Sept.

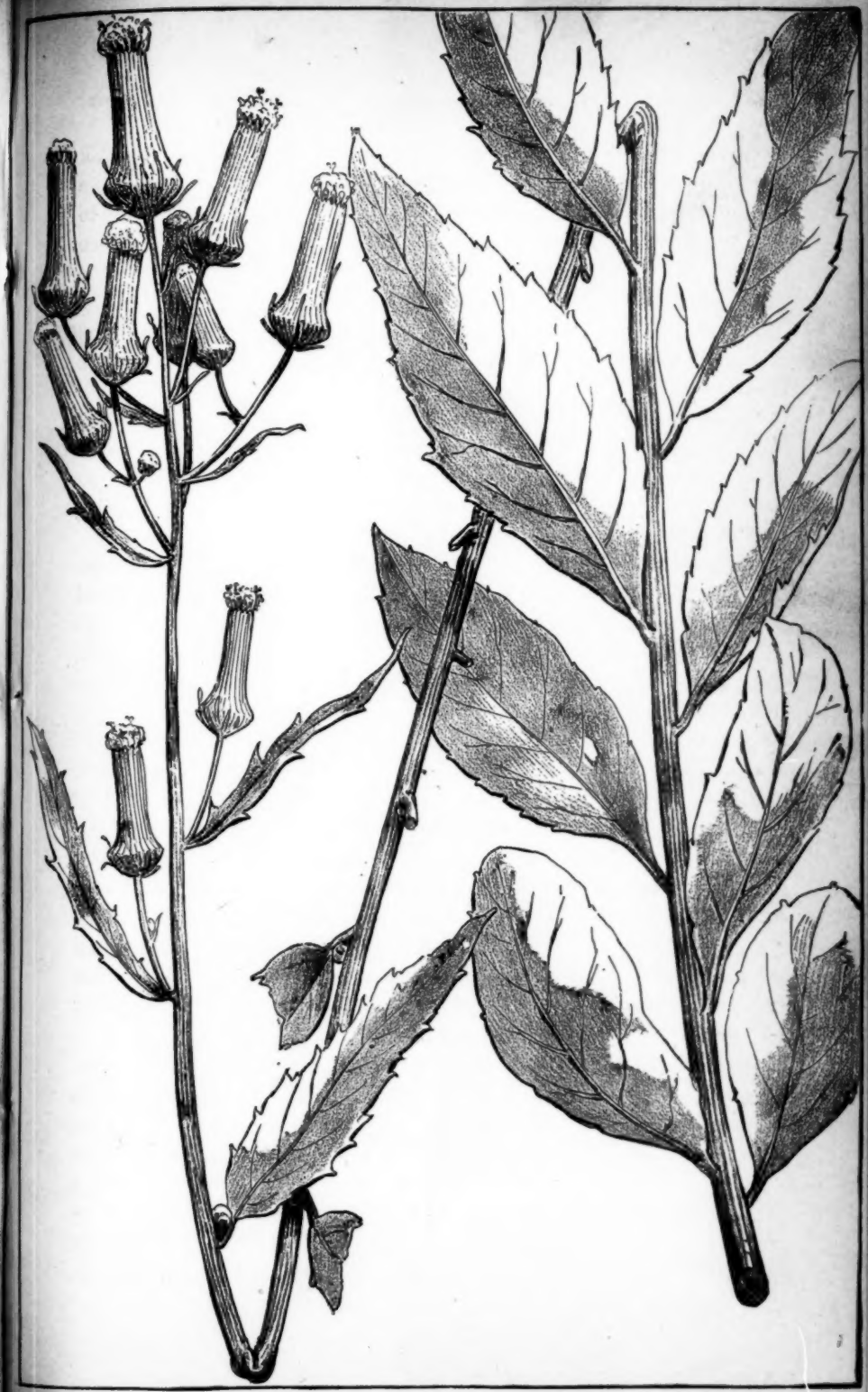
Erigeron canadense, L. (Horse-weed. Butter-weed.) Bristly-hairy; stem erect, wand-like (3°--5° high); leaves linear, mostly entire; those from the root cut-lobed; heads very numerous and small, cylindrical, panicled. Waste places; a common weed, now widely diffused over the world. July--Oct. Ligules much shorter than their tube, white. (Nat. in Eur. etc).

after. Its height varies from two to six feet, having a single stalk with a diameter of from three-fourths to one and one-half inches, and a bright green leaf from one to two inches in width and from three to eight inches in length. Its flowers appear only near the top, and when mature, are covered with fine white down, much resembling that of the common thistle, which is carried by the wind to a great distance. The effect of the maturing of the plant and its coming into flower is so marked that the yield of essential oil is decreased thereby within a single week fully 50 per cent.; and indeed, if the plant is not cut promptly at maturity, the yield of essential oil is only about one-third of what it would have been two weeks preceeding. The fireweed plant has a most thrifty, robust and glossy appearance, and is never seen in the peppermint plantations, excepting in the rarest instances, and then is usually found growing singly.

The erigeron canadense is entirely distinct in its nature, growing almost entirely in open stubble fields and "summer fallows," and along the roadside, its stalks scarcely ever exceeding a half or three-fourths inch in diameter, and the leaves scarcely a half inch in width, and two or three in length. Its flowers are very minute, and are distributed more uniformly over the surface of the plant. Erigeron is much richer in essential oil than fireweed, the former sometimes yielding over 20 lbs.of essential oil to a charge of 2000 lbs. of plants. The yield of fireweed seems to average about 50 per cent. of that of erigeron, the plants being distilled under like favorable conditions.

Now as to the characteristics of their essential oils: Unfortunately, most of the physical tests, and the reagents usually employed in such analyses do not give as widely varying results between these, as between most other oils; but when submitted to spectral analysis, I find fortunately, a test which is quite decisive, and this accordingly has the greater prominence; but others more easily operated and equally as certain, *if due precautions are taken*, are also given.

First, eight samples of natural oil of erigeron were operated upon, (the natural oil being taken, as it is this quality which has hitherto been mostly known in commerce.) For the purpose of showing the relationship between specific gravity and polarization, these two tests are given in conjunction with each other. The polariscope used is a "Mitscherlich," with a perception tube 200 mm. in length, made by De Sage of Heidelberg, being the instrument referred to in the first article of this series, (in the April No. of the AMERICAN JOURNAL



OF PHARMACY); the temperatures for sp. gr. and boiling points were taken by a thermometer specially treated at Yale Observatory[1].

NATURAL OIL OF ERIGERON.

No.	Sp. Gr. at 15° C. 59° F.	Polarizing Angle.
1	·870 (resinous.)	—60°
2	·864	—51
3	·856	—23
4	·865	—58
5	·864	—51
6	·861	—30
7	·864	—47·5
8	·865	—57
Totals	6 909	377·5

Dividing totals by 8 gives average polarization of —47·19, and sp. gr. ·8636.

Having five samples of the oil of fireweed of my own distillation, they were submitted to like tests at the same temperature, with the following results:

No.	Sp. Gr.	Polarizing Angle.
1	·858	— 4
2	·854	— 3·5
3	·847	+35·5
4	·905 (resinous)	+33
5	·907	+44
Totals,	4·366	+110.

Dividing by 5 gives average polarization of + 22 and Sp. Gr. ·8732.

It will be noticed that the fireweed polarizes with wider variations than does the erigeron, yet fortunately in no case within the limitations of the former; the two most nearly approaching each other being No. 1 fireweed and No. 3 erigeron, which still show a difference of 19° while the average difference, as will be noticed, is 69·19°. It will also be seen that sample No. 3 of erigeron gives not only the lowest polarizing angle, but is also the lowest in sp. gr., and this seems to hold good in nearly all the essential oils the spectral analysis of which I have undertaken. This I found to be caused by the resin

[1] The importance of having thermometers in chemical analyses, which have been standardized and corrected by the astronomer of Yale Observatory or some other equally reliable authority, cannot be over-estimated. The writer has found that many finely constructed and expensive thermometers which he had formerly placed much confidence in, after having been used for some time in chemical work, had their readings changed fully 10° C. (18° F.), rendering them unfit for use. Thermometers corrected and standardized can be obtained at prices ranging from $5 to $10.

which had formed in the oil by oxidation. This resin is opaque and cannot of course of itself produce an optical test, but when added to the oil increases its optical activity. This discovery was verified by the fact that all rectified samples, except in the cases hereafter referred to, were found to have less rotatory power than the original oil operated upon. This phenomenon was noticed when pipmenthol and menthol, both of which were found showing no distinct polarization, are added to oil of peppermint, the rotatory power being increased the same as with the addition of the opaque resin.

By the tests given above it will be noticed that the average of the sp. gr. of the fireweed samples is ·0096 greater than the average of the erigeron; but this is accounted for by the fact that Nos. 4 and 5 of the fireweed were extremely resinous; whereas quite the reverse result is obtained when samples of the oils are compared under like conditions of oxidation. This should be borne in mind as having an important bearing on the test. It was found that when samples of the oil in like conditions either of freshness or oxidation, were examined, that the sp. gr. of the fireweed was about .012 less than that of erigeron; and upon submitting the oils to fractional distillation and taking a like number of fractions of both, the sp. gr. of the fireweed was about ·011 less than the erigeron.

To find the varying characteristics of the products obtained by fractional distillation, careful distillations were made by diffusion or steam, the distillate being divided in each case in 20 fractions by weight, the process being continued as slowly as practicable, that the fractions should present as distinct characteristics as possible.

In the distillation of erigeron, 100 pounds of natural oil was used, the polarizing test of which was, — 50·5°. After 18 full fractions of 5 pounds each had been recovered, it was found from the slowness with which distillation progressed, and the high color and sp. gr. of the distillate, that but little more could be obtained; but the process being continued for a long time with increased power, 3 pounds more were obtained for the 19th fraction [93 pounds in all.] The remaining 7 pounds which was not recovered, was drawn from the still mixed with the water which had condensed therein, and separated, when cooled, into a solid resin of a dark reddish brown color.

In the rectification of the fireweed, divided in like manner, 18 full fractions only were obtained, the portion representing the last two fractions forming also a solid resin; but that of the fireweed was of a

light straw color. Upon submitting the different fractions to the sp. gr. and polarizing test, the following results were obtained:

ERIGERON.			FIREWEED.		
No. of fraction.	Sp. Gr. at 15°C.	Polarization.	No. of fraction.	Sp. Gr. at 15°c.	Polarization.
1.....	·8598	+10	1.....	·825	—4
2.....	·860	+13	2.....	·82575	—4
3.....	·862	+15	3.....	·8263	—4
4.....	·862	+15	4.....	·8268	+1
5.....	·86225	+15	5.....	·827	+5
6.....	·86225	+15	6.....	·8273	+4
7.....	·86225	+15	7.....	·8275	+4
8.....	·86225	+15	8.....	·8255	—2
9.....	·86225	+14·5	9.....	·8267	0
10.....	·86225	+14	10.....	·8269	+1
11.....	·86275	+12·5	11.....	.6277	+1
12.....	·8628	+12	12.....	·8282	+1
13.....	·8629	+11	13.....	.8292	+4
14.....	·8635	+8	14.....	·831	+5
15.....	·865	0	15.....	·840	+2
16.....	·8672	—3	16.....	·8568	—9
17.....	·8684	—35	17.....	·888	—53
18.....	·9169	—43·5	18.....	·919	—85
19. 3 lbs..	·9388		19.....	Resin	
20. 7 lbs..	Resin		20.....	Resin	

It will be noticed that the same phenomenon occurs in the fractional distillation of fireweed, as that which the writer discovered in oil of peppermint, recorded in the Proceedings of the American Pharmaceutical Association for 1885, vol. 33, page 579, and farther mentioned in vol. 34, page 129), viz: That after several fractions have been recovered in which the sp. gr. constantly increases, there is a point found near the middle of the distillate (which in this case occurs in the 8th fraction) where the direction is changed to a decreasing one. In the case of fireweed, however, there was but one fraction which showed the decreasing tendency, although fraction 9 as well was lighter than fraction 7. When peppermint is divided in the same manner, there is a greater number of fractions showing this phenomenon. It is also a remarkable fact that the polarizing test is similarly affected at this stage, as the polarization is also changed from + .4 to — 2.

None of the fractions of erigeron show this change from *rising* to *falling* gravity; but it will be noticed that there is a *tendency in that direction*, as the fractions from 5 to 9 inclusive *remain stationary* rather than rising, while in both there is a rapid increase in the last fractions.

Taking now the eighteen fractions of each oil united in equal parts by weight, the following results were obtained:

ERIGERON.		FIREWEED.	
Temperature F.	Sp. Gr.	Temperature F.	Sp. Gr.
40°	·878	40°	·867
60°	·86975	60°	·85925
80°	·8603	80°	·8501

It will thus be seen that the rectified fireweed is about ·011 lighter than erigeron. In this test, however, the last 3 pounds obtained from the erigeron was not used, being rank in odor. Had this been used to fairly represent the fresh oil in a state of purity, it would have raised the sp. gr. about .001, so that it is safe to say that the density of fireweed under the same conditions of freshness as erigeron, is about .011 to .012 lighter.

It will be noticed that the first 15 fractions of fireweed average about ·035 lighter than the same fractions of erigeron. Fractions 16 and 17 when united are about equal. The 18th fraction of fireweed is somewhat heavier than the corresponding one of erigeron, and nearly though not quite so heavy as the equivalent last portions obtained from the erigeron when proportionately united.

A distinct test, and easy in the hands of the pharmacist, is here obtained; that when erigeron is fractionally distilled in the presence of water and divided in fractions either of 20 or 2, the first portion recovered will not vary from ·860. When fireweed is treated in like manner, the first portion (no matter how many the fractions) will not be far from ·826. And this wide difference is certainly sufficient to identify the one from the other.

As a phenomenal feature in the polarization of the fractions of erigeron, it will be noticed that while the oil originally operated upon was strongly lævogyre (polarizing — 50·5°) the first 14 fractions are actively dextrogyre, and the 15th neutral; with the 16th a lævogyre rotation is shown of 3°, which tendency is rapidly augmented in the 17th fraction by an increase of 32°, finally reaching in the 18th a point — 43·5. These 18 fractions when united polarize at — 28°.5. The first 3 fractions from oil of fireweed are lævogyre; the rotation changes in the 4th to dextrogyre, which is continued until the 8th fraction is reached, when the left-handed rotation again occurs. The 9th is neutral; with the 10th the dextrogyre rotation is shown, which is continued until the 16th, when the direction is suddenly changed again to the left by a reversion from + 2 to — 9. The rotatory activity in

the 17th fraction is *rapidly augmented* the same as in the erigeron, but in a still more marked degree, rising from — 9° to — 53°. In the 18th fraction a remarkable polarization of — 85° takes place, being the highest yet noticed in an essential oil.

Boiling Points.—In making this test, 20 cc. of each oil were placed in a test tube, immersed in an oil bath of ordinary temperature and slowly heated[1]. When the bath had attained a temperature of 340° the boiling began slightly in the fireweed at 331°; the bulb of the thermometer being immersed in the liquid, as there was not sufficient vapor to give a good indication. Within the space of a minute the temperature of the oil rose to 360°, boiling violently. The temperature of the vapor was found to be 358°. By applying more heat and raising the bath to a temperature of 410°, the oil attained a temperature of 370° with the vapor at 365°. On continuing the boiling for some time, it was found quite difficult to increase the temperature more than 3°. It was not found that the oil had evaporated to the extent of 5 per cent., so that the boiling point of the vapor of fireweed during the progress of the distillation of the first 5 per cent. is mostly between 358° and 365°. The oil used in the above test was the natural oil of fireweed used for the rectification mentioned.

In oil of erigeron at 340° slight ebullition was shown, the thermometer immersed in the oil. At 347° boiling progressed vigorously with the vapor at 342°. Continuing the boiling four minutes, the temperature of the vapor had risen to 347°, at which it was practically constant.

From this it will be observed that the boiling point of the fireweed-oil under the same circumstances is about 18° to 20° higher than that of the oil of erigeron.

Chemical Reactions.—This branch of investigation was unfortunately quite unfruitful, both oils fulminating vigorously with iodine, yet with less violence than spirit of turpentine. Upon adding to 50 drops of each oil from one to three drops of nitric acid alternately, (sp. gr., 1·2), there were no special colors produced, the only effect being that in eight hours the erigeron had changed to a dark straw color, the fireweed being of a medium brown. (In the case of peppermint a beautiful spectral effect is produced.)

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[1] This precaution of immersing the oil under analysis in a bath at a temperature below its boiling point is important, as more exact and uniform results can be obtained in the earlier stages.

Treating the oils in the same way with pure sulphuric acid, the fireweed changed within thirty minutes to a very dull brown, the erigeron to a bright red color.

Upon moistening chloral hydrate with the oils, there was very quickly produced in the erigeron a delicate green tint, which remained permanent for some time. With the fireweed a similar but less delicate tint was produced, disappearing however, within a few minutes. (Peppermint produced with chloral hydrate a beautiful rose.)

Further, as to physical characteristics, both oils are quite alike in oxidation, since resin is formed rapidly within both upon exposure to air. There is fortunately a distinguishing characteristic in the resin of the two oils, that of erigeron being a deep brown red, imparting its color to the oil. The oxidation of fireweed has but a slight effect on its color; indeed, as has been stated, its resinoid when separated is of itself light in color. Both the oils, when oxidizing, deposit a layer of resin upon the sides and bottom of the bottle, differing in this respect greatly from peppermint, which holds the resin suspended in the oil.

One other interesting phenomenon was observed which I will mention in closing. This happened in the last pound obtained in the rectification of 100 lbs. erigeron. The bottle containing the same was set aside during the month of November last for future investigation, remaining in a cool room, but exposed to the action of the light during the winter. In the meantime a delicate formation had spread through the oil somewhat resembling the aquatic form of life known as the sea-urchin. An effort was made to separate this from the oil, and had due precautions been taken by maintaining the same temperature throughout the process, the separation might have been accomplished; but the structure being extremely delicate, was dissolved and lost. The same bottle is still retained with the hopes that the formation may again appear, when an effort will again be made to separate it.

From the experiments made in the foregoing, the following comparisons between the two oils may be made, and the following conclusions drawn:

1. Polarization. Pure oil of erigeron in the natural state should not polarize nearer the zero point than — 26, nor farther than — 60; rectified oil freed from resin may polarize some nearer the zero point than the limit given, and the first fractions should be dextrogyre. Pure

fireweed if lævogyre should not polarize farther than — 4, and if dextrogyre farther than + 4.

2. Specific gravity. Pure natural oil of fireweed unless resinous (which may be noted by leaving a stain upon paper when evaporated) should not possess a sp. gr. above ·855, nor below ·845; and erigeron under like circumstances not above ·865, nor below ·855. The difference in sp. gr. being about ·010.

3. Boiling point. The temperature of the *vapor* being taken, fireweed should not vaporize to any marked extent below 355°; nor should this temperature be increased more than 10° F., until five per cent. of the oil has been evaporated. Erigeron should not boil vigorously below 342° F., nor above 347° F., until five per cent. has been volatilized.

4. Resinoid. When distilled with water or steam, the resinous product of erigeron is a deep reddish-brown; that of fireweed a light straw color. The effect of rectification by steam with both is to produce a brilliant and colorless oil. Both oils possess characteristic odors. As these cannot be well described, I may find occasion to comply with the requests made that samples of both shall be furnished the different pharmaceutical colleges and associations of the country, where those interested may have an opportunity of comparing for themselves both oils in a state of purity.

The investigations recorded are, by no means, considered complete or sufficient, and it is hoped that farther research will develop some tests which may be both efficient and easy of application. The need is evident from that fact that the writer has not been able to find in the hands of a pharmacist, except in the rarest instances, a sample of the oil of true fireweed, which showed by its odor even a trace of the oil.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 17th, 1887.

At the last Pharmaceutical Meeting, session 1886–87, Vice-president Wm. J. Jenks presided. The minutes of the last meeting were read and approved.

The registrar reported that the following books had been received for the library: Report of the Commissioner of Education for 1884–1885; Epitome of the Newer Materia Medica, issued by Messrs. Parke, Davis & Co., of Detroit; and the fourth volume of the Report of the Bureau of Ethnology, by J. W. Powell, issued under the auspices of the Smithsonian Institution.

Fifteen specimens of Chinese Materia Medica were exhibited, illustrating a paper on this subject published a short time ago in the *Medical and Surg. Reporter* of this city, by Stewart Culin.

A paper upon Bechi's test for *cotton-seed oil* was read by Jos. W. England, Ph. G., who also exhibited a number of different oils, pure and mixed with cotton-seed oil, illustrating the effect upon them of the reagent proposed by Prof. Bechi.

Prof. Maisch said that in testing for the purity of olive oil, he had relied mainly upon two reagents, strong sulphuric acid and a cold mixture of sulphuric and nitric acids; both these reagents, when dropped to the oil upon a white plate, would scarcely change the color of pure olive oil, but with cotton-seed oil or several other cheap oils would produce a red or brown color; while thus an adulteration was shown, these test liquids would not identify cotton-seed oil. This is done by Bechi's test and this gives it its great value as cotton-seed oil is the main adulterant of olive oil at the present time, but probably not the only one since the sample of olive oil imported in Florence flasks was shown by Mr. England to be free from cotton-seed oil; but it acquired a red color with the acid test.

Prof. Remington said that olive oil is now used almost as a mere flavoring material to the cotton-seed oil, such is the extent to which this fraud is carried; the amount of cotton-seed oil exported to Europe is somewhere near 20,000,000 gallons for which there is no ostensible use, except that of mixing with olive oil.

Prof. Trimble said that while the subject of mixing oil and decolorizing was being discussed it might be stated that mineral oil, one of the recent sophistications of castor oil, was deprived of its fluorescence by adding a small quantity of *nitro-naphthalin*.

Mr. England stated that Prof. Maisch had suggested that the reaction by Bechi's test upon cotton-seed oil was probably due to the yellow coloring principle.

Prof. Maisch said that a method of destroying this coloring matter which persistently remains with the oil and even with the soaps prepared from it, had been a study for many years among European investigators and as yet no satisfactory process had been devised.

Mr. Webb stated that in the last revision of the pharmacopœia, cotton-seed oil had been directed in place of olive oil in making *linimentum ammoniæ*. and that it was a failure, the liniment thus made being a thin unadhesive preparation quite unfit for the purpose designed.

Prof. Remington stated that a low grade of olive oil suitable for liniments, could easily be obtained. This green and almost always rancid oil was obtained by racking off the oil from the settlings of the oil vats, and sold as *commercial olive oil*; being very cheap it don't pay to adulterate it. He said that about this time last year he went through the oil producing districts of southern Europe, and the methods of making the oil were of the most primitive kind; an old press turned by two or three men forced the oil out from the olives, and so dirty and common a process was it, that he felt little disposition to indulge in olive oil since. There is something in cotton-

seed oil that when it is subjected to heat gives rise to acrolein products which render all substances cooked with it disagreeable to the taste and injurious to the stomach; whether this is connected with the coloring matter or not is as yet an unascertained fact. But the coloring matter of cotton-seed oil which may probably be of a resinous nature, is a source of great trouble in a commercial way and prevents its use in making white soaps. The soap may be white for a time, but in a few months brown spots develope, and finally the whole material looks so badly that it can only be sold by working it over into a colored soap. There is a very handsome fortune for the discoverer of some efficient and practical method of accomplishing the removal of this matter.

Mr. Frank X. Moerk read a paper upon *subiodide of bismuth*, and showed a number of samples made by different processes. Mr. England stated that the use of this substance was increasing; it is used as an antiseptic like iodoform, and is also given internally in the form of emulsions in doses of five to thirty grains.

Mr. Steinmann read a paper upon *colorless solution of hydrastis*, and Mr. Clarkson, one upon *cacao shells*, of which no analysis appears to have been published. The use they are put to, that of adulterating spices, led to a discussion of the subject, one of the members stating that "ground black pepper" had been offered at two cents per pound, and inquiry elicited the formula by which it was manufactured; 90 pounds dried bread, and 5 pounds each of charcoal and black pepper were ground together. Another member stated the mouldy ship bread which came back from sea voyages was bought up for this purpose.

Professor Trimble read a paper entitled *Laboratory Notes*, giving the results of various analyses made by different students in the laboratory during the last winter. Prof. Maisch inquired whether the amount of ash was calculated on the air dry or exsiccated drugs, and it was stated that the air dry articles were used. Professor Maisch exhibited a specimen of expressed oil of mustard seed made by him 23 years ago, which had remained sweet till a short time since.

Prof. Trimble read a paper upon *acetate of amyl*, or pear oil, as it is termed. It is now largely used as a menstruum for dissolving gun cotton, for which purpose it does not need to be purified with the care that the pear oil used as a flavoring essence is; the latter is worth $2.50 per pound, while the cruder article can be had for that much per gallon.

Mr. England stated that in one of the Italian journals a very inexpensive process was reported.

Professor Remington said that a California doctor called on him lately, and showed him a root which he was sure could be made to yield a fortune if made into a patent medicine; the root was quite aromatic, and reminded him of lovage or angelica. Professor Maisch said that the small sample shown had the characters of *osha root*, which, twenty years ago, attracted some attention, and which was derived from an undetermined umbelliferous plant.

Prof. Remington read three prescriptions sent to him from Canada by

one of our late students; they were so complex as to remind one of the formulas in vogue some two or three hundred years since, about twenty-five or thirty different substances being thus mixed up.

Prof. Maisch read *notes on a few drugs*, giving the results of a number of examinations of different substances made by Mr. Geo. M. Beringer.

Mr. Boring asked what the status of the apothecary was under the *high license law* lately passed. No one present appeared to be sufficiently familiar with the new law to reply to the query; but it was stated that the law was not operative till January 1st, 1888.

Inquiry was also made in regard to the *State pharmacy law*. It was not known whether the law had passed both houses, and it was stated that the clause requiring graduates in medicine to have at least three years experience as apothecaries to entitle them to registration, which was recently struck out by the Senate, left the bill in such a shape as to permit the registration as pharmacists, of physicians, without requiring of them pharmaceutical experience, or an examination testing their competency, while previous to registration, an examination before the board was required of all graduates of colleges of pharmacy without regard to the length of time they had spent in pharmaceutical establishments, the lowest limit being four years.

There being no further business the meeting adjourned.

THOS. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Albany College of Pharmacy held its sixth commencement March 8th, the graduating class numbering 18. Valedictory address by J. J. Barton.

The Chicago College of Pharmacy held its annual meeting March 8th, at which the following officers were elected: George Buck, president; W. K. Forsythe, vice-president; D. H. Galloway, secretary; W. A. Puckner, auditor, and J. S. Jacobus, treasurer. Ten members of the board of trustees were likewise elected.

The Alumni Association, Cincinnati College of Pharmacy, at its annual meeting, March 30th, inaugurated a series of social entertainments, and made arrangements for the reading of papers at the quarterly meetings. Mr. A. W. Bain was elected president, H. Serodino, secretary, and Emil Heun, treasurer.

The Illinois College of Pharmacy held its first commencement in February with a graduating class of ten.

The Louisville College of Pharmacy held its commencement March 10th, the graduating class numbering eleven. Gold medals were awarded to W. M. Reed for best examination, and to E. R. Constantine for the best thesis.

Alumni Association, New York College of Pharmacy. The officers elected at the annual meeting March 24, are: C. F. Heebner, president; Wm. Wright, Jr., A. Stover and A. L. Metz, vice-presidents; G. A. Palmer, secretary, and L. M. Royce, registrar.

The National College of Pharmacy at Washington, D. C., had a graduating class of twelve, the commencement exercises having taken place May 5.

The Pittsburgh College of Pharmacy had its commencement March 15th, with seven graduates. Examination prizes, consisting of a gold and a silver medal, were awarded to W. C. Gordon and G. B. Little. Prof. S. H. Stevens delivered the valedictory address.

The St. Louis College of Pharmacy held its twenty-first commencement March 17th, with a graduating class of 44. A gold medal for highest proficiency was awarded to E. E. Hunter; a copy of the National Dispensatory for the most meritorious thesis, to A. H. Sippy; a set of scientific books for the best chemical laboratory work, to V. J. Mueller; and the junior students prize, the National Dispensatory, to J. G. Vogt, M. D. Professor Curtman delivered the valedictory address.

At the annual meeting held April 25, Mr. C. F. G. Meyer was elected president; Louis Schurk, vice-president; G. H. C. Klie, recording secretary; H. M. Whelpley, corresponding secretary, and S. Boehm, treasurer. It has been decided to enlarge the college building during the summer.

The Alumni Association, St. Louis College of Pharmacy held its eleventh annual meeting February 15, and elected the following officers for the ensuing year: W. C. Bolm, president, Wm. H. Gallenkamp and Wm. H. Motz, vice-presidents; H. M. Whelpley, recording secretary; F. F. Witting, corresponding secretary; Chas. Geitner, treasurer; Albert Weber, registrar. Messrs. J. W. Tomfohrde and Thos. A. Buckland, Jr., were elected to fill vacancies in the Executive Board.

The Connecticut Pharmaceutical Association held its eleventh annual meeting at Meriden, Feb. 1st and 2nd. The total membership was 252. Balance in treasury $1221.64. Eight active and two honorary members were elected. A number of papers were read on chemical and pharmaceutical preparations made by some of the members and placed on exhibition, during the meeting, no other exhibition being held at the same time. The officers for the present year are: C. W. Whittlesey, New Haven, president; J. O. May, Naugatuck, and J. H. Parker, Meriden, vice-presidents; F. Wilcox, Waterbury, secretary, and L. H. Goodwin, Hartford, treasurer. The next meeting will be held in Willimantic, February 7, 1888.

Georgia Pharmaceutical Association. The twelfth annual meeting took place on Cumberland Island April 12. A number of papers were read, and the Rankin prize of $20 for the best paper was awarded to H. R. Slack, Jr. The establishment of a College of Pharmacy in connection with the new school of technology in Atlanta was discussed, and Messrs. Schumann, Rankin and Stanford were appointed a committee to further the plan. Geo. D. Case, Milledgeville, was elected president; F. A. Cheatham, Macon, W. B. Shuptrine, Savannah, and C. H. Behre, Atlanta, vice-presidents; H. R. Slack, Jr. secretary, M. H. Taylor, Macon, treasurer, and W. S. Parks, Atlanta, local secretary, the next meeting to be held in Atlanta July 10, 1888.

Louisiana Pharmaceutical Association. The fifth annual meeting was held in New Orleans April 13 and 14. Among the papers read were the following:

On syrup of ferric oxide; indigenous medicinal plants; on tobacco and on gelsemium. The endeavor to secure the enactment of a pharmacy law for the State was not successful, but the efforts will be continued. It is contemplated to establish a College of Pharmacy in connection with the medical college of Tulane University. The officers elected for the ensuing year are: C. L. Keppler, president; W. Carson and J. C. Godbold, vice-presidents; L. F. Chalin, secretary; L. B. Lavigne, treasurer: and Mrs. E. Rudolph, corresponding secretary. The next meeting will again be held in New Orleans April 11, 1888.

Nebraska State Pharmaceutical Association. The sixth annual meeting was held in Omaha May 10–12th, President James Reed in the chair. The usual reports of officers and committees were read, and considerable prominence was given to the pharmacy law which was recently passed, and a resolution was passed without a dissenting vote, requesting the Board of Pharmacy to recognize diplomas of reputable Colleges of Pharmacy requiring four years' practical experience.

The membership exceeds 500, about 120 having been elected at this meeting.

Papers were read on "pharmaceutical education," by Rob. J. Brown, and on "commercial pressed herbs," by H. D. Boyden. Honorary members were elected as follows: R J. Brown, Leavenworth, Kan., and Professors P. W. Bedford, J. M. Maisch, J. P. Remington, S. P. Sadtler and O. A. Wall.

The officers for the ensuing year are: M. E. Schultz, president; C. H. Bruner, P. C. Corrigan, W. B. Shryock, W. P. Haller and W. P. Hughes, vice-presidents; C. J. Daubach, secretary; J. Forsyth, treasurer, and W. C. Lane, local secretary. The next meeting will be held at Lincoln, May 8th, 1888.

EDITORIAL DEPARTMENT.

Retirement of Professor Robert Bentley.—At the meeting of the Council of the Pharmaceutical Society of Great Britain held May 4th, a letter from Professor Bentley was read intimating his intention to resign the professsorship at the termination of the present session. Action on this communication was deferred to a subsequent meeting.

Mr. Bentley was a student in the School of the Pharmaceutical Society, and at the examination in 1842 was awarded the single prize then offered by the Society. While Lecturer on Botany at the London Hospital in 1849, he undertook also to finish the course of lectures on the Society's School, interrupted by the illness and death of Prof. A. T. Thomson, whose successor Mr. Bentley became in the same year. When, in July 1851, Prof. Pereira retired from the chair of Materia Medica, Mr. Bentley was appointed Professor of Materia Medica and Botany, the two courses being united into one. In this capacity he has labored to the present day.

In the United States Professor Bentley is known as a teacher mainly by reputation; but his literary labors are very generally known, more particularly his excellent "Manual of Botany," and the voluminous work on "Medicinal Plants," which he issued jointly with Prof. Henry Trimen.

The Pennsylvania Pharmacy Bill has been signed by Governor Beaver May 24th. We have not been able to procure a correct copy of the new law in time for publication in the present number of the JOURNAL; but we learn that the clause, which as stated in another place, had been stricken out by the Senate, requiring physicians desiring to be registered as pharmacists without examination, to have had not less than three years continuous practice in pharmacy, has been restored by the conference committee of the two Houses. Whilst thus the law is less objectionable than it had been made by the Senate, still the fact remains that—as far as we know—no other state and no other country enjoys a pharmacy law totally ignoring pharmaceutical education, and declaring as superior to it, for the purposes of practising pharmacy, a medical education supplemented by a few years of shop-experience. Whether Pennsylvania has reason to be proud of this achievement, is a question, in answering which no argumentation is needed.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Atlas Manuel de l'Histologie des Drogues simples. Par J. Godfrin, Professeur à l'École supérieure de Pharmacie de Nancy, et Ch. Noël, Préparateur à la même École. Paris: Librairie F. Savy. 1887. 4to.

Hand atlas of the histology of simple drugs.

This atlas consists of 45 plates, each containing representations of two or more drugs, mostly in transverse sections, and magnified to such a degree that the elements of each tissue may be seen in their various details. The first two plates, containing the starches and other pulverulent drugs, are followed by nutgalls, cryptogamous drugs, woods, barks, rhizomes, roots, leaves, flower-buds, fruits and seeds. The figures are reproduced partly from drawings and partly as phototypes, and are faithful representations of the sections as seen under the microscope. Each plate is accompanied by brief explanations of all the details observed in each figure.

It has been the desire of the authors to place into the hands of pharmacists, and particularly of students, a practical work illustrating the anatomical structure of frequently-used drugs, and serving at the same time as a manual for the general histology of materia medica. In making the selec-

tions such drugs have mainly been chosen which present some interesting anatomical characters, or which are liable to substitution or adulteration. The number of drugs illustrated must, therefore, obviously be limited, and the selection is not confined to such as are recognized by the Codex. Of the cinchona barks, necessarily several species had to be admitted, and in addition is found also the important cuprea bark, as well as the bicolorata bark, which latter is now almost unknown in the United States. This must also be said of the nux vomica bark, which is still quoted in works of reference as false angustura bark, but rarely, if ever, seen in our commerce. Podophyllum, which has found its way into most modern pharmacopœias, has received a place in this work, and so has likewise the comparatively recently introduced cascara sagrada, which, thus far, is recognized only by the British Pharmacopœia; but senega has been omitted, though its particular structure makes it a subject of interest to the student of materia medica. Other omissions of a similar nature might be mentioned; but it must be remembered that the scope was intended to be limited, and it must be granted, that with few exceptions, the illustrations are equally interesting and practically useful to the American student, as they appear to be for the French. For these reasons the work deserves to become known and used also in the United States. The authors state that in having recourse to the most simple processes of reproduction, they have aimed to preserve the simplicity and clearness of the designs, preferring rather to sacrifice their artistic value; but the latter has not been lost sight of, and the former has been fully accomplished.

Die Alchemie in älterer und neuerer Zeit. Ein Beitrag zur Culturgeschichte, von Hermann Kopp. Heidelberg: Carl Winters' Universitäts-Buchhandlung, 1886. 8vo. 2 vol., pp 260 and 425. Price in paper covers, 16 marks. Alchemy in olden and more recent times. A contribution to the history of culture.

Perhaps no scientist living has done more for tracing the history of chemistry from the most ancient times to the present, than the author of the volumes now before us. His "History of Chemistry," published forty years ago, and his more recent historical works, entitled, "Contributions to the History of Chemistry," and "Development of Chemistry in Modern Times," testify to many years of patient study and faithful critical disquisition, through which he was enabled to present a clear record of facts embodying the evolution of chemistry from crude and incoherent observations and ideas to the exact science of the present day. Follies, deceptions and impositions in great number mark the gradual progress, and among them none had secured a firmer hold upon mankind than the faith in the art of the transmutation of metals, and more particularly of the making of gold. Many of the votaries of alchemy were firm believers in the ultimate success of this hidden art, which has its adherents even in the present time, and dates back to at least the fourth century of our present era. That in its vain search for gold it was productive of numerous discoveries which helped to build up a positive science, is well-known; but the present work does not deal with these results. It is devoted altogether to the history of this erro-

neous faith and obscure art in their numerous ramnifications, and is therefore a most valuable contribution to the history of the gradual progress of culture, and likewise of literature since the voluminous writings of the alchemists and of the rosicrucians are concisely cited and explained.

Written in the full light of the present knowledge of chemical laws and proven facts, its language is nevertheless so free from technicalities, and its diction is so engaging and captivating, that it will be read with undiminished interest, not only by chemists, but by cultivated people generally. It sounds almost like fiction that in this enlightened age the art of gold making still lingers in some secluded localities, and that the faith in its success flickers occasionally in the brain of some honest student.

Aus der Molecular-Welt. Eine Gratulations-Schrift an Robert Bunsen, von Hermann Kopp. Dritte Ausgabe. Heidelberg: Carl Winter. 8vo. pp 105. Price 2 80 marks.
From the world of molecules.

An excellent little work treating in a humorous manner of the modern views of atoms, molecules and chemical compounds. The author states in the preface that it was first written in 1876, but laid aside, until a few years ago, he concluded to revise it for publication in commemoration of the seventy-first anniversary of the birth of his friend Prof. Bunsen, who at that time was sojourning in Naples. The book must be read to appreciate its attractive humor and also its fine points of sarcasm.

Mémoire sur les Volumes Moléculaires des Liquids. Par Hermann Kopp. Heidelberg: C. Winter, 1886, 8vo. Pp. 47.
Memoir on the molecular volumes of liquids.

This memoir was written in reply to one by Bartoli, which appeared in *Annales de Chimie et de Physique*, March, 1886, and which condemned in principle the results of a long series of researches, published by Professor Kopp more than thirty years ago in *Liebig's Annalen*. The rejoinder, in which the author undertakes to point out various errors of Mr. Bartoli, invalidating his conclusions, was intended for publication in the same journal in which the latter's paper appeared; but owing to a rule governing publications in the *Annales*, to avoid controversies likely to assume a personal character, it was suggested, but not concurred in by the author, to suppress certain sentences from Mr. Kopp's memoir, which he considered essential, or with the view of an early publication, to materially abridge it. The correspondence given in the preface, refers to this, as well as to some matters connected with the history of alchemy published by Mr. Berthelot. The subject matter of the memoir itself treats of questions the elucidation of which has formed a considerable portion of the author's prolonged scientific labors.

Dose and Price Labels of all the Drugs and Preparations of the U. S. Pharmacopœia of 1880, *etc.* For the use of Pharmacists, Physicians and Students. Second edition. By C. L. Lochman & Co., Bethlehem, Pa. Price, in paper cover, $1.25; in flexible muslin, $1.50.

Besides the pharmacopœial articles, a large number of extra-pharmaco-

pœial drugs, chemicals and pharmaceutical preparations are embodied in this work, which, as the title indicates, is intended to supply labels giving the dose and price of each article. But these labels contain also synonyms, the origin of the drug, the composition and strength of the preparation, medical properties, solubilities, etc.—information which in many cases will thus be found useful and convenient of access. The proof-reading has been done with great care.

In addition to the labels, which are intended to be attached to the receptacles in the store without replacing the usual shop labels, the book contains also tables of weights and measures, an explanation of thermometer scales, and lists of abbreviations in prescriptions, of incompatibles, of new remedies and of German names with their English equivalents. We consider the work, which has been very carefully prepared, as a very useful one for the purposes indicated above.

A Manual of Weights and Measures, including principles of metrology; the weights and measures now in use; weight and volume, and their reciprocal relations; weighing and measuring; balances (scales) and weights; measures of capacity; specific weight and specific volume, etc., with rules and tables. By Oscar Oldberg, Pharm. D., Professor of Pharmacy and Director of the Pharmaceutical Laboratory in the Illinois College of Pharmacy. Second edition, revised. Chicago: Chas. J. Johnson, 1887. 8vo pp., 246. Price, $1.50.

On its first appearance, we have noticed this work at some length in our volume for 1885, page 639, to which we refer. The main portion of the present volume is identical with the former, but a few typographical errors have been corrected, and a chapter on coefficients of expansion has been added, with a number of valuable tables, showing, for numerous liquids, the rate of expansion by heat and the variation in specific gravity, apparent and corrected. There has also been added a table containing the weight of a bushel of a large number of articles as established by the laws of the different States; these weights vary in some cases for the same commodity in the proportion of 2:3, or 7:10, or even more. We conclude our present notice with what we said of the work two years ago, namely: That it deserves to be carefully read by physicians and pharmacists, even though the reader may not agree with all the views expressed by the author.

The reception of the following pamphlets is hereby duly acknowledged:

Thirtieth Annual Report of the Council of the Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria. With list of members and hon. members. Melbourne: 1887. Pp. 15.

Annual Address delivered before the American Academy of Medicine at Pittsburgh, Pa., October 12th, 1886, by R. S. Sutton, A. M., M. D., of Pittsburgh, Pa., President of the Academy. Pp. 13.

Twenty-sixth Annual Report of the Cincinnati Hospital for the fiscal year ending December 31st, 1886. H. M. Jones, Superintendent. Pp. 78.

Massachusetts State Agricultural Experiment Station at Amherst. Fourth annual report for 1886, pp. 130; and Bulletins No. 23 and 24 for March and April, 1887.